FOOD MANUFACTURE

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

The New Marketing Scheme

PROVISION for separate marketing boards for milk distributors and manufacturers will probably be a feature of the new marketing scheme which is being prepared in detail, at the request of the Minister of Food, for those sections of the milk industry. The representation of the various interests concerned on the respective boards is believed to have been agreed upon, and the composition of the Manufacturers' Board may bear considerable resemblance to that of the Milk Products Marketing Board, which has been in suspense since the outbreak of war. If separate boards be established the functions of milk depôts and creameries in regard to the wholesaling of liquid milk will, according to present proposals, come under the control of the Distributors' Board, although such premises may be engaged in varying degrees in milk manufacture.

Well-informed quarters are convinced that the milk manufacturing industry will not regain its former magnitude for some considerable period after the war. The Government is confidently expected to continue the subsidisation of liquid consumption under the national and school-milk schemes, and official warnings have already been given that winter production will be insufficient to meet requirements after the war. It is clear, therefore, that the post-war summer surplus available for manufacture will be very much less than that of pre-war years, and it is feared that the milk manufacturing industry will be relatively small until such time as the national milk produetion has been increased far beyond the present output. Many creameries may continue to be classified as redundant after the cessation of hostilities, as the national manufacturing capacity will be far in excess of the available gallonage of milk.

Future of the Fishing Industry

The urgent need for restoring the British fishing industry has recently been ventilated in the *Hastings Observer* in an interview with Mr. James Hornell, a former fisheries official in India, who has made a close study of the history and development of the town's fishing industry and is one of the local representatives appointed by the Ministry

of Agriculture and Fisheries on the Sussex Sea Fisheries Committee.

Mr. Hornell considers that the measures needed for the post-war development of inshore fishermen, especially those of Sussex, are: (1) Co-operation of the fishing community at every considerable fishing port of the country; (2) technical education of fishermen; (3) utilisation of by-products; (4) introduction of an improved type of boat, diesel-engined and with a wheel-house.

In the course of amplifying these suggestions Mr. Hornell called attention to the need of financial help by Government or banks, by means of loans at low rate of interest, to purchase larger boats and otherwise assist fishermen, who would be members of a co-operative society formed *ad hoc*. Such a society should have sufficient financial resources to maintain a small, fully equipped factory for the utilisation of such by-products as the fish liver oils. The society's programme should include (said Mr. Hornell) the disposal wholesale of the entire catch of each boat belonging to a registered member or crew, thus by-passing one set of middlemen's profits. The programme of education is very ambitious, and includes not only navigation, net-making, maintenance of engines, but knowledge of antiseptics, refrigeration, quick-freezing, curing, smoking and canning as well as biology and oceanography.

The educational idea is good, but the industry would have to be sufficiently attractive to prevent a new generation of embryo fishermen of high scientific attainments from seeking fresh woods and pastures new. On the other hand, if the standard of education is not sufficiently high to admit of this possibility, a little learning may turn out to be the proverbial dangerous thing.

Herring Industry Committee's Report

The report of the Herring Industry Committee is eminently clear in its exposition of a complex situation, and rich in practical suggestions for restoring the industry to health. Not the least of its merits is that it crystallises its advice in urging the reconstitution of the Herring Industry Board, which functioned with considerable success in the few years before the war. If this authority is recreated with larger powers than it previously possessed with more generous financial backing from the Government, the Committee are persuaded that the post-war prospects of the industry "ought to be not only good but bright".

A number of opinions on the proposals embodied in the report have been voiced by representatives of the trade.

Mr. A. I. B. Stewart, Secretary to the Federation of the Scottish Herring and White Fish Catchers and of the Clyde Fishermen's Association, said that Clyde fishermen would welcome the recommendation that the commercial possibilities of cold storage and dehydration be investigated at once to deal with seasonal gluts. He also approved of the recommendation that the Herring Industry Board should have the power to buy, sell, process and export herring and generally assume the powers of a trading concern. The difficulty hitherto had been that the Board had no authority to deal themselves in herring, and the recommendation bore out the contention made by fishermen that, so far as the Clyde was concerned, buying and distribution required drastic overhauling. The Board's suggestion to charter boats, while perhaps offering difficulties, would make the necessary provision for the young men who have been fighting for their country.

Provost A. D. M'Nair, Campbeltown, Chairman of the Clyde Fishermen's Association, is of the opinion that the reconstitution of the Herring Industry Board would be welcomed provided the fishermen were adequately represented. The attempts made by the Board to improve the position of the industry were praiseworthy, and had seemed likely to meet with success, but the war intervened.

Mr. Gordon Davidson, a member of a firm of fish curers who are interested in the industry at many points—as curers, kipperers, and boat owners—expressed himself as very well pleased with the report. It laid down, he said, the lines of a very good start in reviving the Scottish industry. He thought it might be found that the grant and loan funds for procuring new boats might not be quite adequate. A new boat would probably cost, even with some scaling down in the present values, something about £4,000. At that rate the capital assigned for the purpose would provide only some 200 boats—not enough for the replacements that would be required after the war. However, he thought it reasonable to hope that if the state of the industry warranted expansion in the fleet, the financial provision might in due course be reviewed.

Mr. Davidson considered that the report offered very useful powers to the Herring Industry Board. Given a Board of able *personnel*, he believed that with such powers the industry could be firmly re-established. The first essential of a successful policy was that the fishing ports should be cleared from day to day. That would require power for the Board to take up surpluses. A strong Board would have a great effect in healthy regulation of the fisheries at all stages—catching, processing, and selling.

Representatives of the industry in North-East Scotland found much of the report acceptable, but voiced some fears. A Peterhead curer felt that the real post-war problem would be how to induce girls in the fishing industry to accept smaller wages than those they now earn as munition workers. A Wick curer said that the report ignored the need to regain the Russian market.

Beet Prices

Scottish farmers say they are being forced to grow sugar beet at a loss, and have protested to the Food Ministry and the British Sugar Corporation against prices proposed for this year's crop. The National Farmers' Union backs them, saying: "No reasonable explanation has yet been given why a commodity of such national importance should be assessed by the Government at a value which makes its cultivation uneconomic on the average Scottish farm."

Sugar beet, like flax, is a compulsory crop, and in the past two years the farm war committees, instructed to secure enough beet to keep the Scottish factory working at full production, have served orders on hundreds of farmers to grow specified quantities. The union declares that the necessity for these orders "is an indication of the reluctance with which farmers have embarked on the venture".

Scotland's last beet crop was the best ever grown. Official returns, based on actual results of processing during the 1943 campaign, show that the average yield worked out at 8½ tons to the acre, and sugar content of the beets at 17 per cent. English growers get a few shillings more per ton than in Scotland, but they pay the cost of transport to the factories. North of the Border the factory pays carriage on the beets, but against this Scottish farmers say that the crop yield is at least one ton per acre higher in the south.

Rôle of Expert Witnesses

In the course of giving judgment on a recent case where the label on an article of food was alleged to be calculated to mislead, Mr. Justice Wrottesley made some interesting remarks about the rôle of expert witnesses in this type of case. He said that "experts in these cases are of course chemists, and they are there to inform the Court of the composition of the subject matter of the charge. In addition they are, like all expert witnesses, entitled, if asked, to give their opinion—based on their examination of the subject matter—provided it is within the scope of their special knowledge. The question whether a label is calculated to mislead means calculated to mislead the public, not the qualified chemists, and so it is a question not for qualified chemists, but for the Justices and the Court. Unfortunately, of course, in these cases we find that manufacturers are very prone to use phrases such as 'concentrate', 'extract', 'essence', 'cordial'—phrases which may very well have special meaning for the chemist. It is not surprising, therefore, that a chemist should tell the Court that an article is not his idea of an essence or an extract, but that is not the test. The test is: What does the ordinary man understand by the language? Was he misled? Not whether the chemist was misled, but whether the ordinary man was misled. Nor is such an enquiry—that is to say, of the analyst—in a case of this kind primarily, in my judgment, at any rate, the kind of reasonable diligence referred to or the enquiry referred to in Section 6. It savours too much of the enquiry: How close can I sail to the wind without being taken to book? And that is not the sort of diligence that Parliament had in mind in Section 6 or in the corresponding Section 83.

"Different considerations would apply if the subject matter were a drug or some chemical compound the nature of which would not be known to the ordinary person in the street."

Stimulation of Milk Production

In view of the results obtained by previous workers, a detailed investigation of the effect of iodinated protein on the milk production and clinical physiology of the dairy cow have been carried out under the auspices of the Agricultural Research Council since 1941.

"Ardein", a commercial preparation of the ground nut (*Arachis hypogœa*), rich in the globulin, arachin, has been iodinated under semi-commercial conditions, and the iodinated "Ardein", containing 0·88 per cent. acid-insoluble ("thyroscine") iodine, has been used in two experiments, states K. L. Blaxter, *Nature*, 152, **3869**, 751.

When 50 gm. of this material was fed, milk production increased 35 per cent. and fat production 54 per cent. This was accompanied by an increase in the resting pulse or heart rate, in the resting respiration rate and a slight increase in the rectal temperature. After seven weeks' treatment with 50 gm. a day the cows lost 9 per cent. of their original weight. Even after seven weeks' treatment at such a high level, the sectional abnormality shown by the cows was not so severe as was expected, and when treatment was stopped the live-weight was rapidly regained. The subsequent history, performance and post-mortem appearance of animals subjected to such drastic treatment did not indicate that their health had been impaired. Four experiments were conducted with iodinated casein, and it was found that the response in milk production to a standard dose (30 gm.) of a highly thyroid-active preparation is dependent on the initial level of production of the cow. It was found that a dose of 15 gm. daily of iodinated casein increases milk production by approximately 16 per cent., and 30 gm. daily by 33 per cent., indicating that the percentage response in milk production is directly proportionate to the dosage within that range.

Experiments are now in progress to find whether a practical application of the results is possible, especially with regard to the winter milk production.

Butter Makes History

That war-time food discovery, an Australian butter non-melting in tropical climates, is a titillating piece of news following research work by Wiley and Hills of the Commonwealth D.S.I.R. The new form is produced by dehydrating ordinary butter and heating the butter fat with salt, milk powder, and 19 per cent. of hydrogenated butter fat which raises the m. pt. to 105° F. "Tropical Spread", as it is called, will indeed raise nostalgic longings among all in this country who in normal times never cried out, like Lewis Carroll's Carpenter, that "the butter's spread too thick"; who never took to their hearts (or their mouths) Mège-Mouries's substitute as they did butter itself.

The tale of butter makes curious history. One can trace it back as foodstuff to the Hindoos of 200 B.C. and to early Greeks—but not to Greeks and Romans of the first Christian centuries, nor to Macedonians, since these used butter as an ointment. Indeed, the uses (or misuses) of butter sound incongruous in the light of to-day when at tea-time we hardly know (literally) on which side our bread is buttered. Butter used as a bath; for wounded elephants; and, not so long ago in Scotland, as oil for lamps and for smearing sheep, indeed! The history goes on to such landmarks as 1186, when Germany bartered wine for butter at Bergen; to 1695, when John Houghton told of Irish burying it in bogs for "rotting" (a relic of days when strongly flavoured butter was the *desideratum*); to Denmark's rise from a mere 10 million pounds exported in 1866 to 200 million pounds by 1914. In our English prose, too, the very word has its incomparable significance; as, for example, when Thackeray and others repeated the four-centuries-old phrase: "She looks as if butter would not melt in her mouth".

Confectioners' Wartime Worries

Reviewing the changes which the war has brought to the Scottish confectionery trade, Mr. H. A. Gilderdale in *Confectionery News* gives full credit to the Ministry of Labour and the Ministry of Food for the way in which they had co-operated with the trade on matters in which they had been consulted. The railway companies and M.C.A. transport officers also deserved credit for valuable help.

The majority of Scottish firms, he said, by reason of their somewhat easier position in the labour market, had been given considerable responsibilities in the industry's concentration scheme. Several Scottish manufacturers were undertaking some work on behalf of English firms and also a considerable amount of Government work.

The manufacture of chocolate goods had increased under the scheme and at least one prominent English manufacturer had set up plant in Scotland to produce standard products. With so much transferred production and increased home manufacture the Scottish manufacturing trade, he thought, was experiencing no difficulty in providing sufficient goods to meet the 3-oz. ration, and on the whole a wide variety of lines was being provided for the public—far more than the trade had ever dared to hope.

The problem of distribution was far from easy, particularly in the rural areas, but the Scottish trade's greatest problem was the labour shortage, and one method of easing this position was by maintaining the closest collaboration with the Manpower Boards of the Ministry of Labour and also the Ministry of Food. Another method was the employment of a considerable number of part-time workers, and, speaking personally, he had found that these, if properly organised, could be used to definite advantage, although absenteeism was a troublesome aspect.

Transport was another difficult problem, especially from the point of view of damage and pilfering. The railway companies did all they could to give protection to goods in transit, but pilferage seemed to be increasing. The shortage of packing materials constituted another serious difficulty, but although paper-board remained in extremely short supply, by evolving a complete new series of packages and making larger units the rule, they were able to get the utmost out of the supplies available. The very simplest form of wrapping had been adopted.

Milk Products "For Attack"

Colonel J. J. Llewellin, Minister of Food, speaking at a Press Conference on February 8, said that the non-priority allowance of liquid milk would not be increased above the present winter level of 2 pints per head per week so early as in 1943. The reason for the delay is not due to any falling off in milk production. In fact, the January yield was expected to be about 10 per cent. greater than in the corresponding month last year, and the seasonal increase in production has already begun. The Minister said that the purpose is to conserve supplies for manufacture for use by the Forces.

Creameries have been at least as active during the winter as they were in the corresponding months a year ago. Now, in advance of the normal manufacturing season, they are to produce very considerable quantities of what Lord Woolton described as "food for attack". Condenseries will play an important rôle in this production, followed by cheese factories; little butter is expected to be made apart from the utilisation of cream from milk intended for skim-milk powder or condensed skimmed milk. Full-cream products are usually desirable for the Forces because of their greater nutritive value, and sweetened condensed milk has the additional advantage of ensuring that the men get sugar as well.

Mechanical Handling Equipment

PART II

Considering productive industry as a whole, it can be said that the majority of manufacturing processes necessitates the subdivision of work into individual departments, each of which operates as a separate entity, yet is dependent upon the work of the other departments for the successful completion of the work in hand.

FRANK H. SLADE, A.M.I.Mech.E.

IT SHOULD be stressed that in order that the healthy life-stream of industrial life might be maintained, only handling equipment that is fundamentally sound should receive universal application, and this equipment should be applied to the problem in hand only after it has been carefully studied in order that the correct solution may be found, for incorrectly applied handling equipment is a liability, and not the asset it should and can be.

Gravity Conveyors

Gravity conveyors are conveyors in which the materials to be handled must obviously move more or less in a downward direction. These are usually gravity chutes, spiral gravity chutes, roller conveyors or spiral roller conveyors. Gravity chutes are well known as a method of conveying materials from a higher to a lower level, the degree of inclination depending upon the friability of the materials being handled. Gravity spiral chutes were dealt with fairly comprehensively in Part I. There are, however, various " do's and don'ts " in the use of gravity roller conveyors to ensure that the maximum benefits accrue. This type of equipment is often maltreated and used to its minimum advantage. The first thing to be considered is the erection of a gravity runway or roller conveyor, this operation being exceedingly simple if carried out in the correct manner.

To commence, the first section should be erected on two stands or trestles; each following section requires one stand only, excepting bends, which require an additional support in the centre of the section. The stands should be placed as near the section joints as possible; also it is essential that the hook end of the section points in the direction in which the run is to be fixed.

Gradients

As the operation of the runway depends upon the force of gravity, it is necessary to employ a gradient varying from 2 to 5 per cent. Table 1 indicates the gradients for 8-foot lengths of runways, and gives the amount one end of the runway will have to be raised to give the gradient required, this gradient being dependent upon the nature of the load being carried, weight, etc.

TABLE 1

Per Cent. Gradient.	*Elevation Per 8 Ft. Length (Inches).*
2	$1\frac{7}{8}$
3	$2\frac{7}{8}$
4	$3\frac{7}{8}$
5	$4\frac{3}{4}$

For general working purposes 4 inches per 8-foot length of runway (approximately 4 per cent.) will be found most suitable. Should a 4 per cent. gradient cause the runway to reach ground level before the point of discharge, a fall of 3 per cent. or even 2 per cent. may be adopted, but the material being handled may require a push at various points; this is indicated in Fig. 1.

Where the distance to be covered is too great to erect in this manner, or too many operatives would be

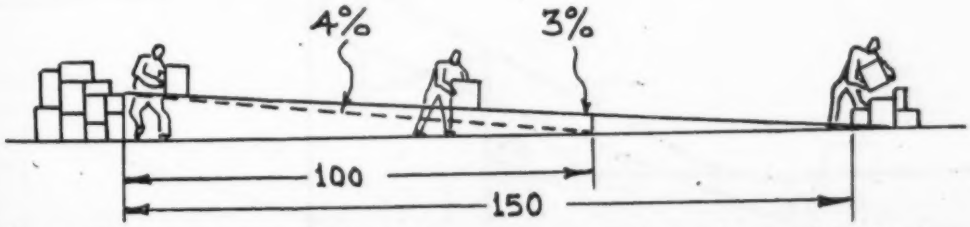

Fig. 1.—If a 4 per cent. gradient would cause the runway to reach ground level before the point of discharge, a fall of 3 per cent. or even 2 per cent. may be adopted, but the articles may require a push at various points.

needed to accelerate the material along the runway, erection as shown in Fig. 2 should be adopted and the material between the sections elevated by hand, or alternatively a portable mechanical humper should be used; this is indicated in use by Fig. 3, and the actual humper is shown in Fig. 4. These are usually inclined at an angle of 45°, and are inserted in any convenient part of the runway, producing what is termed a renewal of the gradient. The appliances are usually driven by an electric motor, and a 45° humper operating at a speed of 12 to 18 inches per second requires for a performance of elevating 1 ton a space of 3 feet and a power input of 20 watt hours. Another application of the humper is for loading vehicles at the lower terminal of the runway.

It must be emphasised that the runways should never be erected in the manner shown in Fig. 5, as it only leads to congestion and material damage—and unfortunately it is an all-too-common occurrence.

From the foregoing it is apparent that it pays to have one man in charge of the runway to supervise erection, storage and maintenance. He will, after a short time, find that it is a quick and easy job to calculate the required length and heights with pencil and paper before application.

It has been already stated that it is important that not less than three rollers should constantly be in contact with the material being handled. Sometimes it is found that certain articles will not run well on rollers; these articles with recessed bases, uneven or soft surfaces can easily be conveyed by placing them on boards or on goods that run easily. Examples of such articles are sacks, baskets or casks.

The latter, however, sometimes will be found, if within the scope of the rollers, to run on end, but not on bilge. A further aspect is that square-based articles, too small to bridge three rollers, can sometimes be placed cornerwise, when they will bridge the requisite number of rollers and run smoothly.

Although gravity runway is intended to be used as a gradient, in special cases it is found convenient merely to place the gravity runway on the floor and push the material along. This particularly applies when dealing with very heavy cases, which would otherwise be handled on loose rollers.

The gravity runway can be applied to many problems, and with a little practical experience all its possibilities become evident.

Portable Mechanical Handling Equipment

Such equipment as Humpers, Band Conveyors, etc., are examples of portable equipment, the foremost of these, as already seen, being invaluable in renewing the gradient in a roller runway system. The Piler is a machine similar to the portable humper, and it is designed to take the place of unnecessary and expensive labour in stacking. These pilers can be fitted with conveying mechanisms to suit any type of application; they can be fitted with hardwood slats mounted upon malleable iron chains, buckets instead of slats, special arms to handle barrels, drums, etc., bars mounted upon chains, or wide belts. The enormous amount of time saved by the utilisation of this equipment is realised when their duties are reviewed. A slat piler will handle packages up to 2½ cwt. in weight at a speed of 1,000 packages per hour, while one make of chain-and-bar-type piler is capable of handling sacks of 20 stone each of flour, grain, sugar, etc., at a capacity of 600 to 800 bags per hour.

The piler or loader illustrated in Fig. 6 is an inexpensive Belt Loader which will handle practically all kinds of loose material, and by its use will represent a con-

Fig. 2.—Where the distance is too great for sufficient gradient to allow the articles to run well, it is advisable to erect as shown and elevate by hand.

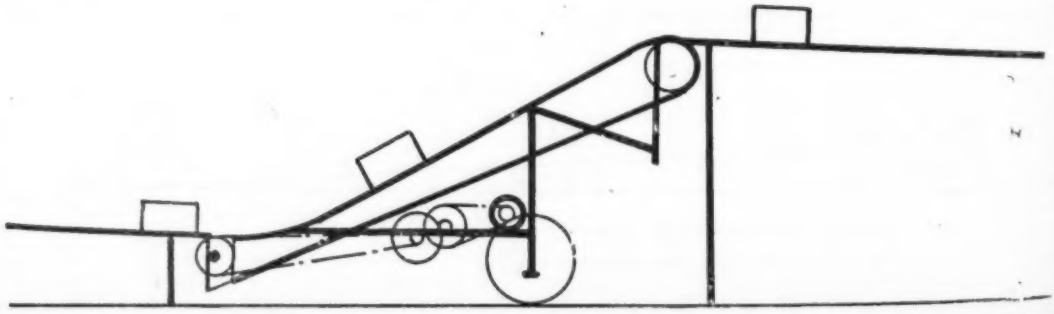

Fig. 3.—Alternative method of elevating between two sections of runway at different elevations is, as shown, by Mechanical Humper.

siderable saving over ordinary methods of loading, being manufactured in sizes that will deal with up to 100 tons of material per hour with a maximum power drive of 3¼ horse-power.

Portable Band Conveyors can handle cased goods, sacks, bales, etc., and also bulk goods such as granulated sugar with equal facility. Belts of different types are employed in this equipment for various reasons; for example, cased goods and bales are carried upon canvas or sewn cotton belts, while frozen meat is usually carried upon a rubber-faced canvas belt. For exposed situations, and also when handling sticky materials, the rubber belt is again used, while for bulk materials the belt is troughed in order to convey large quantities and also to prevent the material from spilling.

Belt conveyors are made in all lengths and of various widths, and small conveyors made portable on wheels complete with driving mechanisms are of inestimable value in the food industry. The duties of these conveyors vary from 1 ton to 1,000 tons per hour, according to the capacity required and the material handled.

A portable mechanical handling appliance that saves valuable man-power in its employment is illustrated in Fig. 7. This is the portable continuous overlapping goose-neck elevator. It is mounted on wheels so that it can be moved as required to various machines in the factory or to the various points where material has to be moved from a lower to a higher level. It will be noted from the illustration that the action of loading on to and discharge from the elevator is carried out smoothly—a very desirable feature in the food industry.

These elevators are also manufactured as fixtures for bulk materials, having a 60° angle with continuous overlapping buckets.

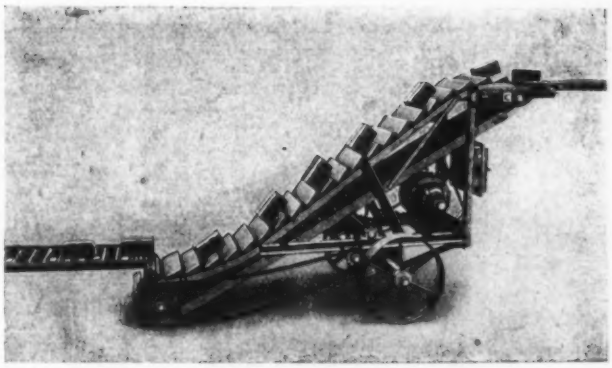

Fig. 4.—Mechanical Humper for erecting in between two sections of runway at different elevations.

(Courtesy: Rownson, Drew and Clydesdale, Ltd.)

Belt, Slat, and Steel Band Conveyors

Belt, Slat and Steel Band Conveyors have inherent advantages in that the power required for driving them is small, their capacity large, their operation smooth, which means that the material being conveyed is safe-guarded from injury, and a further great advantage is that breakdown during operation is seldom encountered.

However, it should be stressed that the installation of a fixed conveying system such as this is limited to where there is a line flow operation, and also to conditions where the movement of materials is always fixed from point to point. It is well known that material handling during manufacture is normally the department availing itself of saving methods; it generally harbours waste effort, unnecessary handling, or some situation costing money that can be easily eliminated by proper study and co-ordination. The ideal co-ordination during manufacture, therefore, means that materials should be maintained at one level during manufacture. It costs much money to change levels; it increases man-hours and investment in handling facilities; it can be seen from this that, once the manufacturing level is set and a constant line flow assured for a considerable period of time, a conveyor such as the type under consideration embraces all the advantages that lead to efficient production. The operator is kept at his position by moving materials to and from him by means of mechanical handling; the supervisor has his set-up so arranged that he does the walking and, at a glance, knows that the operator is kept in his position with work so scheduled that he has a visual measure of the day's production. Band conveyors comprise endless bands of stitched canvas, woven cotton- or rubber-covered cotton duck run over terminal pulleys. The endless belt between the terminal pulleys is supported over the entire length by a series of rollers, a greater number of rollers being used to support the loaded side; alternatively, if both strands of the band are used for conveying, sufficient supporting rollers are used on both upper and lower strands to carry the load imposed upon it. Tension screws are usually fitted to tighten the band in service.

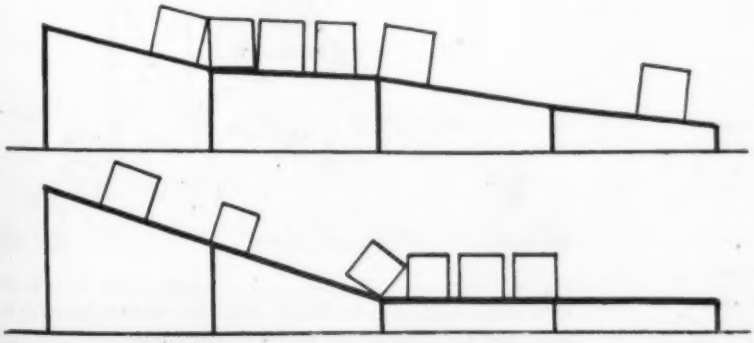

Fig. 5.—Incorrect methods of assembling runways.

Can Filling Conveyor

Fig. 8 illustrates a band conveyor for a special process; this is a 53-foot can-filling conveyor for fruit, etc., consisting of two upper sanitary white rubber belt

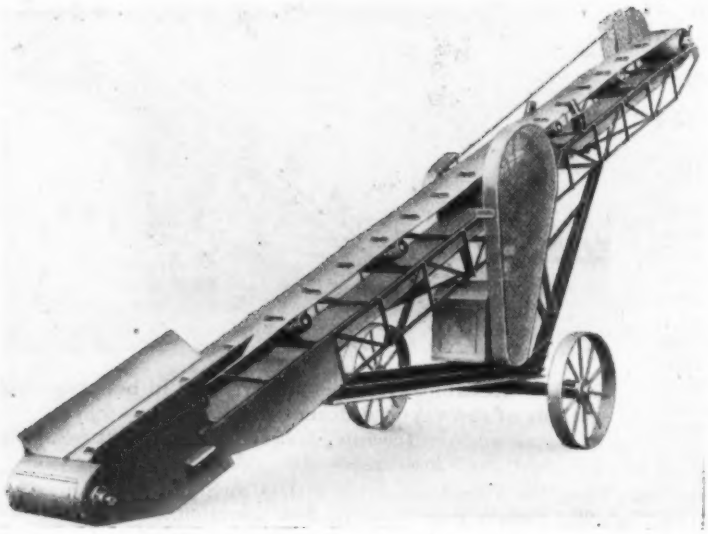

Fig. 6.—Portable Belt Piler or Loader. *(Courtesy: Frederick Parker, Ltd.)*

conveyors mounted on anti-friction rollers and travelling in opposite directions and one lower belt, the three belts being driven from one electric motor through patent enclosed Reduction Gear. Compensating gear is provided to the two upper conveyors to permit of independent tensioning. In operation the empty cans pass continuously along the two upper belts, suitable end deflectors transferring the cans from one belt to the other. The filled cans are placed on the lower belt, which travels at two-thirds the speed of the upper belts, and in turn is lined up with the syruper, exhauster and closing machine. It is not necessary for belt conveyors to operate in the horizontal position only; they can be used with either a slight upward or downward incline.

There are times when a conveyor with a firmer base than the belt conveyor is needed; in such cases it is usual to employ an endless belt comprised of a series of plates or slats mounted upon chains, the drive being transmitted to these by chain wheels. Such conveyors are used extensively for the movement of materials such as boxes, crates, bags, bales, etc.

A type of band conveyor that is particularly applicable to the food industry is the Steel Band Conveyor, especially for handling hot or sticky substances; other advantages in its favour for food processes is the ease with which it is cleared, maintaining the most hygienic conditions.

Some applications have already been dealt with in the preceding articles of this series, however, to further illustrate the utility of steel band conveyors; the following two applications are of particular interest.

Conveyors in Meat Packing Factory

Ten stainless steel band conveyors for a cutting-up room in a large meat-packing establishment in Montevideo are illustrated in Fig. 9. The view is looking on the tension end of the two de-boning conveyors, showing the meat saws and seven trimming conveyors, interlaced at right angles, with platforms, benches and projecting chutes to bottom strands for returned sinews and fats. The carcasses are power-sawn into slabs about 24 inches square by 10 inches thick, containing bones, which are pushed on to the top strands of two horizontal 24-inch-wide de-boning conveyors, from which operators pull slabs on to benches along both sides; bones are cut out and returned to the top strands to deliver over terminals to trucks.

The meat is fed on to the top strands of seven 16-inch wide trimming conveyors interlaced at right angles. Operators at benches at both sides lift meat on to cutting blocks, where it is cut up into small pieces, fat and sinews are taken out, thrown down chutes to the bottom strands and are collected at the tension ends. Only first-class meat is returned to the top strands and continues along until transferred by oblique ploughs at the driving terminals to the top strand of the horizontal portion of a 24-inch wide collecting and inspection conveyor, with trough sides, interlaced at right angles.

Inspectors see that only first-class meat is passing, and after the last inspection the band inclines at 15° to deliver over the terminal at a shredding machine. The conveyor bands are in "stainless" steel, all steel structure is galvanised, cast-iron parts are aluminium

Fig. 7.—Continuous overlapping goose-neck Elevator. It is mounted on wheels so that it can be moved as required to various machines in the factory.

(Courtesy: G. C. Engineering Co., Ltd.)

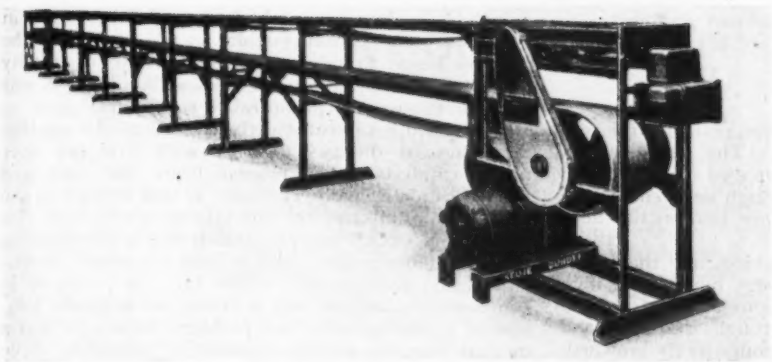

Fig. 8. — This illustrates a band conveyor for a special process. It is a 53-foot can-filling conveyor for fruit, etc., consisting of two sanitary white rubber belt conveyors mounted on anti-friction rollers and travelling in opposite directions, and one lower belt, the three belts being driven from one electric motor through patent enclosed Reduction Gear.
(Courtesy: Robert Kellie & Son, Ltd.)

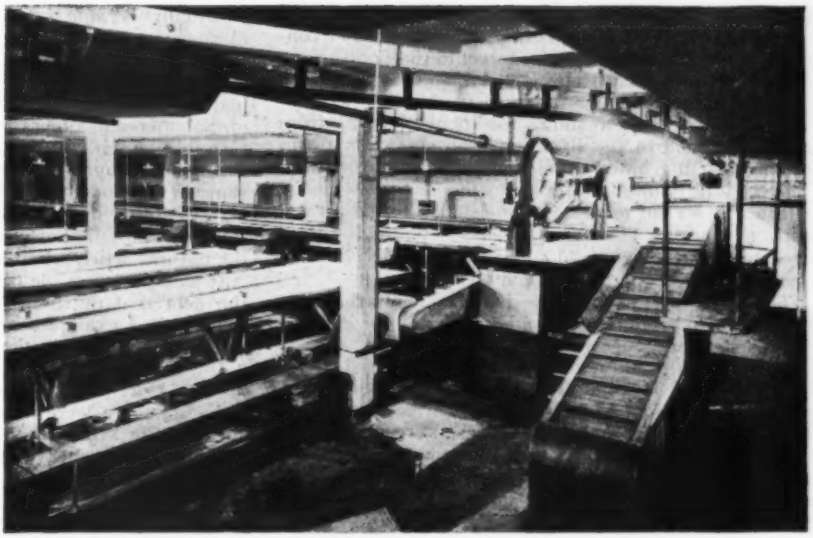

Fig. 9.—Ten "stainless" steel band conveyors for cutting-up room of large meat-packing establishment in Montevideo. The illustration shows the tension end of the two de-boning conveyors, showing the meat saws and seven trimming conveyors interlaced at right-angles, with platforms, benches, and projecting chutes to bottom strands for returned sinews and fats.

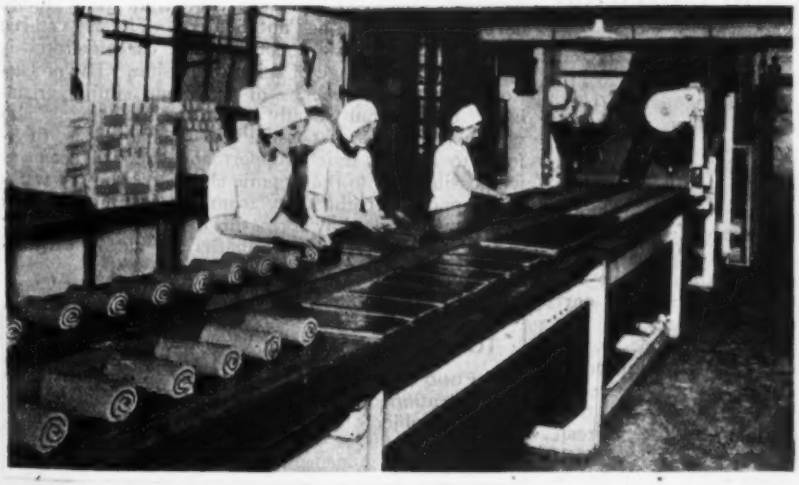

Fig. 10.—A special conveying plant for the continuous production of Swiss Roll. In this picture the operators at the band nearest the camera have been moved in order to give a clear view.
(Courtesy: The Steel Band Conveyor Co., Ltd.)

painted, and all bearings are enclosed and sealed to enable the whole plant to be cleaned down with steam jets.

Swiss Roll Conveyors

The second application is a special plant for the continuous production of Swiss roll. The plant consists of four steel band conveyors (arranged in pairs), two of them side by side passing through an oven on one floor of the building and the other two on the floor immediately below the oven.

The bands are greased by machine, and the batter flows on the steel band in a stodgy liquid form to a width of about 16 inches and depth of about ¾ inch, after which the bands pass through the oven and emerge from the oven with the sponge nicely browned. By sufficient and satisfactory pre-greasing of the band the ribbon of sponge leaves the band voluntarily at the terminal, but as a precaution a piano wire is strained across just in contact with the band. The sponge comes to rest on to two inclined thin fabric band conveyors, which support it in its travel to the floor below, and incidentally turn it upside down, so that the brown side comes face downwards on to the bands below.

The view in Fig. 10 shows the sponge passing from the fabric band to the steel bands on the lower floor; in this two machines which have a wobbling motion deliver either jam or cream on to the sponge, which is afterwards spread to an even consistency by an operator with a spatula. The sponge passes on to the next operator, who gauges and cuts it, after which another operator inspects and rolls the material.

The rolls are check-weighed and assembled in big trays, which are removed to another bench for packing into cartons and outward dispatch.

It is of interest to note that the spreading is carried out close to the machine while the sponge is still warm, so that the final packing in cartons can be done at the vacant end of the conveyors, but when cream filling is used spreading cannot be done while the sponge is hot; time has to be allowed for cooling, and filling is done at the extreme end of the conveyor.

(To be continued.)

Organic Chemistry and Nutrition

A LECTURE on "Organic Chemistry and Nutrition" was given before the Food Education Society on February 14 by Prof. E. C. Dodds, M.V.O., M.D., F.R.S., Courtauld Professor of Biochemistry, University of London, the chair being taken by Dame Louise McIlroy, D.B.E., LL.D., M.D., F.R.C.P. Prof. Dodds sketched the history of the work of the organic chemist in connection with food. It was at the stage when the necessity of the organic chemist was beginning to shift from pure analysis to synthesis and to the production of either new compounds altogether or of substances occurring naturally that the organic chemist began to play an ever-increasing part in food production. The lecturer went fully into the development of margarine manufacture from its beginnings, and mentioned that the first large-scale production of a butter substitute was made by the French chemist Mege-Mouries, whose method won a prize that was offered by the Government of the time. Fresh beef suet was minced and then heated in water with potassium carbonate, and various other ingredients were added. The product had a considerable vogue in Paris, but never became popular in this country. The problem began to take on the appearance of finality when Sabatier and his co-workers showed that it was possible to convert unsaturated compounds such as ethylene into a saturated derivative ethane by passing a mixture of the gas together with hydrogen over nickel catalysts. The process from this date was termed catalytic hydrogenation. It was applied to the conversion of unsaturated fats into saturated ones. By 1910 the Normann process, which was a development of the Sabatier process, had become a workable proposition, and in this year edible fat was produced in commercial quantities and provided the ultimate solution of the butter substitute problem, because it was a method whereby a large quantity of unusable whale oil and vegetable oils could be converted into odourless, tasteless fatty solids at ordinary body temperatures and capable of forming a basis for butter substitute that eventually became known throughout the world as margarine.

Prof. Dodds proceeded to enumerate the problems, such as palatability and loss of vitamins, that still had to be faced. But for the fundamental observations of Sabatier and others who followed him, we should certainly be without the supply of margarine, and the Professor thought that it might come as a surprise to some of his audience to know that the most extensive investigations on the digestibility of margarine have failed to show that it is in any way inferior to that of the natural article—butter.

It would be possible to multiply almost *ad infinitum* the debt that nutrition owes to chemistry, and Prof. Dodds cited examples such as the great gelatine industry and the production of synthetic vitamins.

In discussing the relative values of synthetic and naturally occurring vitamins, Prof. Dodds said that, although there were no experimental results enabling the value of synthetic vitamin A to be compared with fish oil, it was always possible that there exist in the latter hitherto undiscovered substances with a beneficial activity which are obviously not present in the synthetic substances. The same applied to the vitamin B complex.

Prof. Dodds concluded by saying that "prophecy is always an unwise venture in pure science, but one can definitely say at the present time that many future developments can be anticipated. Thus, synthetic approach to the more complicated carbohydrates is well within the range of scientific vision. The production of protein by means of yeast and similar organisms, though not strictly organic chemistry, is also within the range of possibility. It behoves us, therefore, to give as much support and encouragement as we possibly can to the organic chemists who are working apparently right away from the field of nutrition, but whose work may form the basis of advances just as great as did that of Sabatier on catalytic hydrogenation".

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Food Standards

A. TYLER, F.S.I.A.
Chief Sanitary Inspector, Bath

IT is an amazing fact that this country is one of the few that have not adopted a comprehensive system of food standards, but has relied on the administration of general provisions as to the purity of food; and it has been evident to officers engaged in enforcing these provisions that they were inadequate to deal effectively with all the cases in which foodstuffs of inferior quality were offered for sale to the public.

Local authorities and courts of law have probably done their best within the limits of their legislative power to prevent as far as possible the sale of such foodstuffs, particularly where public health was endangered or there has been gross adulteration, but the subtlety of food adulteration in recent years has given rise to so much controversy as to how far the existing legislation has been contravened that the Minister of Health should be asked at the earliest opportunity to exercise the powers given to him in section 8 of the Food and Drugs Act, 1938, to draft regulations as to the importation, preparation, storage, sale, delivery, etc., of food, and to include in such regulations a comprehensive system of food standards.

There is ample evidence available for the consideration of any committee which might be appointed to draft the regulations.

Preservatives and Colours

In 1901 a departmental committee of the Local Government Board,[1] which had for two years been inquiring into the use of preservatives and colouring matter in food, recommended *inter alia* the prohibition of formaldehyde or copper salts in food, the limitation of boric acid to 0·25 per cent. in food, and the amount of salicylic acid not to exceed 1 grain per pound in solid food and 1 grain per pint in liquid food.

There is also the Final Report of the Departmental Committee, 1924,[2] which led to the introduction of the Public Health (Preservatives, etc., in Food) Regulations, 1925-27, which contained provisions limiting the use of preservatives to certain articles of food, prescribing the preservatives which could be used (sulphur dioxide and benzoic acid in specified amounts) and prohibiting the use of a number of metallic, vegetable and coal-tar colouring matters.

More recent still is the Report of the Departmental Committee[3] appointed in 1933 to consider whether it was desirable that the law relating to the composition and description of articles of food should be altered so as to enable definitions or standards to be prescribed, or declarations of composition to be required for articles of food other than liquid milk, and, if so, to recommend what alterations of the law were required.

Standards and Definitions

As a food officer I was impressed, on reading this Report, at the very wide field covered by the Committee in its search for evidence on the many aspects of the problem, and commend its perusal to all who are interested in the subject of food standards. Professional associations, traders' associations, associations of local authorities, scientists, doctors, public analysts, sanitary inspectors and trade representatives submitted their respective views. The Report extends over several pages, but, briefly, the Committee were of opinion that it was not practicable to extend standards or definitions to all articles of food, that housewives would not benefit by a multitude of standards, definitions or declarations of composition, as in a large number of cases they were getting articles of the nature, substance and quality demanded, and that no standards or definitions should be laid down and no declaration of composition required without giving the manufacturers or other persons concerned the fullest opportunity of hearing the proposals and submitting their observations. The Committee also recommended that the contamination of articles of food by arsenic, lead, tin or other impurities which may be contaminated in the process of collection or preparation should be treated as a special question. A further recommendation that specific claims made in advertisements should be deemed to be part of the package label has since been provided for in the Food and Drugs Act, 1938 (section 6).

Suggestions for Standards

In their evidence before the Departmental Committee in 1933, the Society of Public Analysts advocated the intstitution of a comprehensive system of standards and definitions which would ultimately embrace all articles of food, and, as this goes much further than the recommendation of the Committee, the views of public analysts on any new draft regulations will no doubt be awaited with considerable interest. In any case, their observations should be of considerable value when food standards are under consideration.

Many suggestions for standards have emanated from commercial interests, and the Chief Medical Officer to the Ministry of Health, in his report for 1938, referring to these suggestions, stated: "There is often discernible a desire to stifle competition, and that frequently the grade or qualities to which objection is taken are sound, wholesome articles of food, the suppression of which would be a distinct loss to the poorer class of consumers. New standards should therefore apply to all grades and not only to the higher-grade articles. In fact, if any preference is to be shown it should be in respect of the cheaper grades. Where there is doubt of the efficiency of applying a standard, the desire should rest not on whether it will create difficulties in manufacture, although, of course, this aspect must be considered, but whether it is in the public interest that a standard should be laid down." The Chief Medical Officer is to be commended for this timely warning, and it should be borne in mind by those drafting new regulations. It should be ensured that public welfare and not commercial interests should receive first consideration in a matter of this kind.

There are many articles of food to which standards of composition are already applicable, including butter, margarine, condensed milk, dried milk, whisky, spirits,

etc. There are also presumptive standards for milk and skimmed milk, and semi-official standards for jam, vinegar and shredded suet. I am aware that under emergency powers the Ministry of Food have introduced standards for numerous articles of food, but these have been primarily introduced in connection with food rationing and other difficulties in connection with wartime control of the principal foodstuffs. They are no doubt related to the availability of supplies of the various constituents, and therefore subject to alteration from time to time, as instanced by the reduction in the percentage of meat to be contained in sausages.

Except, therefore, as an experiment, these standards cannot be regarded as a satisfactory system, and will probably be revoked immediately the national situation justifies such a course being taken. We should not, therefore, be unduly influenced by these wartime standards.

Despite the desire of public analysts and food officers to have legal standards for all articles of food, it may be found impracticable to fix standards of composition for such articles as meat, fish, fruit, vegetables, eggs, etc., as they are prepared with the minimum of handling and are less likely to be adulterated. There are, however, many articles of food for which at present there are no legal standards as to their nature, substance or quality, and to which such standards might easily be made applicable, such as meat-paste or fish-paste, for which you have no guarantee of the percentage of meat or fish present.

Need for Legislation

Just before the war there was a popular demand for cheese-spreads, some of which contained up to 35 per cent. fat, but in the absence of legal standards varieties of cheese-spreads may contain much less fat. There is no legal standard for cheese, with the result that whether it is made from skim milk or new milk it may still be sold as cheese. Mixtures of cocoa with starch and sugar may be sold as cocoa if the fact that they are mixtures (without disclosing the percentage of cocoa) is disclosed on the label. In America milk chocolate must contain a minimum of 12 per cent. milk solids, but there is no such standard in this country.

Although there is a bacteriological standard for ice cream in the Isle of Man, to the effect that when examined within twenty-four hours of sale it shall not contain more than one hundred thousand bacteria per cubic centimetre, and no *Bacillus coli* in one-tenth of a cubic centimetre, there is no such standard in this country. It has been suggested that ice cream should be made from milk, cream and sugar, with or without eggs, and contain a minimum of 8 per cent. of milk fat. An article sold as honey should be solely the product of the honey bee and not a chemically produced substance. The latter might be designated as "artificial honey", and labelled accordingly. Fruit juices should be what the name implies, and be manufactured and sold in compliance with statutory requirements. There should be standards for cordials, squashes, jams and preserves.

Meat extracts should be made from good muscle fibre and its total creatine content stated on the label.[5] If low-grade meat is used, including offal, the fact should be disclosed on the label. With regard to statutory declarations on labels, the printing should be of such size that it is easily legible.

It should neither be impossible nor impracticable to introduce legal standards for custard powders, baking powders, blanc-mange powders, pudding mixtures, cake mixtures, and many other foodstuffs which are ordinarily consumed by the public, not forgetting sweets and confectionery, wines and cordials, milk shakes, and soft drinks.

Food Substitutes

The ramp which went on during 1940-42 in connection with the sale of "food substitutes" was a striking example of the need for statutory standards of composition.

It is often contended that if housewives only purchased goods prepared by reputable firms they would receive satisfaction, and, while to a large extent this may be true, the fact remains that inferior articles still find their way into shops. There is, of course, the possibility that shopkeepers may be tempted by the offer of a larger margin of profit on goods supplied by firms of less repute. Some shopkeepers even fail to obtain a warranty that the goods supplied to them conform to the requirements of the Food and Drugs Act, and Regulations. It is not sufficient for the Departmental Committee to state "that in a large number of cases housewives get articles of the nature, substance and quality demanded", and leave it at that. An effort should be made to apply standards to every article of food to which the application of such standards is possible. Housewives should no longer be tempted or misled by catch advertisements, attractive labels or wrappings, or the inducement of free gifts.

To give some idea of the need for a wider application of standards, a few cases dealt with during the past three years, some of which came under my own personal investigation, are set out below, with the public analyst's comments:

1. *Egg Substitute.*—Contained no true substitute for eggs; consisted of a solution of synthetic gum, probably made by treating cotton with some chemical; containing only 3·8 per cent. solid matter, the rest being water; had no food value.

2. *Milk Substitute.*—No real substitute for milk; consisted of wheat flour with about 15 per cent. gum, probably gum arabic.

3. *Chocolate Blanc-mange Powder.*—Contained no chocolate; consisted of wheat flour with about 3 per cent. gelatine, dyed with two harmless dyes, a red and a blue, yielding a chocolate-coloured mass on cooking.

4. *Sage and Onion Stuffing.*—No onion present.

5. *Sponge Mixture.*—All it comprised was ordinary flour, a colouring substance and some sweetening mixture; it was found impossible to make a sponge with the mixture.

6. *Black-currant-flavoured Cordial.* — 97·65 per cent. water; 1·75 per cent. sugar.

7. *Apricot Jam.*—25 to 37 per cent. deficient in fruit.

8. *Mustard.*—90 per cent. deficient of the proper proportion of black mustard.

9. *Roast Pork Roll.*—Only 13 per cent. of meat.

10. *Tablets to Increase Tea Ration.*—91.56 per cent. bicarbonate of soda, with a little starch; cost 12s. 2d. per lb. instead of 8d.

11. *Concentrated Peppermint.*—99·75 per cent. water and a small amount of citric acid; in no cir-

cumstances could it be described as concentrated peppermint.

12. *Influenza Mixture.*—Did not contain anything capable of reducing temperature or being of benefit in cases of influenza.

Gelatine

In recent months consignments of gelatine on sale in various parts of the country were found on analysis to consist of industrial gelatine instead of the edible variety. In samples which came under my observation, zinc was present in amounts varying from 90 to 2,040 p.p.m., copper 22 to 43 p.p.m., and arsenic 1 to 4 p.p.m. In addition, four samples contained excess quantities of sulphur dioxide. These results compare very unfavourably with the standard in use in America —viz., edible gelatine must not contain more than 100 p.p.m. Zn, 30 p.p.m. Cu., or 1·4 p.p.m. As. The limit in respect of arsenic agrees with the recommendation of the Royal Commission on Arsenical Poisoning, 1903. In any new regulations there should be included statutory limits of metallic contamination, but in some processes of manufacture it is almost impossible to eliminate all traces of metallic contamination, and in drafting regulations due regard should be given to this.

Drugs

In prosecutions under the Food and Drugs Act, with regard to drugs, the prescriptions contained in the British Pharmacopœia are usually invoked to establish the composition of any article included therein, and it would be helpful therefore if new regulations included a provision to the effect that for the purposes of the Regulations and the Food and Drugs Act, 1938, the prescriptions contained in the British Pharmacopœia in operation at the time the samples were taken shall be regarded as statutory standards. Whatever standards are introduced it is fundamental that they are such that they may be checked with certainty by analysis.

Bacteriological standards should also be introduced in respect of all foods for which such standards are deemed necessary and their application is practicable.

Existing Standards

Several countries accept the Hortvet freezing-point test as evidence in prosecutions for adulteration of milk by added water, and the Ministry of Health should be asked to legalise this test. Apart from any benefit the public may derive from a comprehensive system of food standards and definitions, there is the added advantage that such a system would result in uniformity in administration of the legal provisions. If an article of food has some recognized standard of quality or composition, it is an offence under the Food and Drugs Act, 1938, to sell such food below that standard, but in the absence of such standard the magistrates are placed in the difficult position of themselves having to decide, on the evidence they have heard, what they regard as a suitable standard. To say the least, this is an unfair responsibility to place upon the magistrates or upon the clerks to justices who advise them. Those who have had experience in food adulteration prosecutions will fully appreciate this point, and also how easily this anomaly would be eliminated if legal standards were laid down. Only a few weeks ago the chairman of the Middlesex Sessions, in a case arising out of a successful appeal against a conviction for selling a certain article of food deficient in fat, stated " that it would be of great assistance if the Ministry of Food, or whatever the competent Ministry, would lay down some specification of the requisite contents of the particular article ".

A system of standards should also bring about uniformity among public analysts, which is very desirable, for nothing is more unfortunate in a case than to find that a public analyst appearing for the prosecution has his evidence challenged by another public analyst briefed by the defence. The same may be said in respect of doctors being called for both the prosecution and the defence, particularly where metallic contamination of food is alleged. The doctor for the prosecution might stress that a certain percentage of lead, tin or arsenic present in an article of food is dangerous or prejudicial to health, while the doctor for the defence might be just as emphatic that persons consuming such food would suffer no harm, and probably support his evidence by quoting cases in which he has prescribed medicines containing much larger percentages of these metals. What can magistrates do in such cases? How can they be expected to decide which of the statements should be accepted, particularly if they are reluctant to run the risk of an appeal being made against their decision.

Although the title of this paper is " Food Standards ", it is perhaps a suitable opportunity to discuss the need for standardising canning. I suggest that each tin be embossed or otherwise permanently marked with suitable code marks by which it would be possible to ascertain without opening (*a*) the type or grade of food contained therein, (*b*) the date it was canned, and (*c*) the name and address of cannery. Incidentally, the absence of such marks has given food inspectors much unnecessary trouble when examining tinned foods salvaged from premises damaged by enemy action. The use of code marks would also facilitate inquiries into outbreaks of food poisoning due to tinned foods.

In Russia, I understand, each can is stamped with grade or type, and they employ two standard sizes for almost every product. The factory rules in that country regarding cleanliness and hygiene are stated[4] to be stringently observed, which is worthy of notice. A system of fines ranging from a few kopeks, or a long term of imprisonment, may be imposed on any worker found neglecting cleanliness in his particular job or department. In the preparing rooms the day begins with an inspection of hands. Free facilities for manicure are provided.

In conclusion, the following suggestions are submitted for your consideration :

1. That the Minister of Health be asked to appoint a committee as soon as the national situation permits, to draft new regulations in accordance with section 8 of the Food and Drugs Act, 1938.
2. That such regulations include a comprehensive system of food standards.
3. That statutory limits be laid down in respect of metallic contamination in articles of food.
4. That bacteriological standards be laid down in respect of foods for which such standards are deemed to be necessary in the interests of public health.

In the event of a committee being appointed, it is hoped that evidence will be invited from representatives

of professional associations whose members are engaged in food manufacture, inspection, sampling and analysis, and from medical authorities, in regard to the nutritional value of foods, the use of vitamins, and the adoption of the prescriptions contained in the British Pharmacopœia as legal standards.

New Legislation

New legislation has now been introduced containing provisions for dealing with several of the points discussed in the paper.

The Minister of Food has issued the Defence (Sale of Food) Regulations, 1943, S.R. & O. 1943, No. 1533, the Food Standards (General Provisions) Order, 1944 (No. 42),* and separate Orders for self-raising flour, baking powder and golden raising powder, shredded suet and mustard.

In all probability Orders in respect of certain other foods will be issued from time to time.

The effect of the new legislation may be summarised as follows :

1. The Government have decided that the Minister of Food shall be responsible for the protection of the consumer against false and misleading claims in regard to foodstuffs, including the exercise of certain powers granted by Parliament to the Minister of Health and the Board of Trade.

2. The new powers suspend the provisions of section 6 of the Food and Drugs Act, 1938, and the changes in the law are detailed in paragraph 6 of the White Paper on " The Labelling and Advertising of Foods " (Cmd. 6482).

3. Under the new Regulations a food and drugs authority must obtain the consent of the Minister of Food to the institution of legal proceedings in respect of an infringement of the Regulations, but it will still be possible for the food and drugs authority to prosecute under section 3 of the Food and Drugs Act, 1938. This appeared to be an anomaly, as in the past where samples of foodstuffs have been found to contravene the provisions of both sections 3 and 6 of the Food and Drugs Act, 1938, the two offences have been dealt with at the same hearing, whereas now one offence will be dealt with by the food and drugs authority and the other by the Ministry of Food, probably on different dates. It would be possible, of course, to arrange for the two cases to be taken at the same court at the same time, but to achieve this a considerable amount of correspondence might be necessary between the food and drugs authority and the Ministry of Food.

Apparently the Minister of Food has now realised this anomaly, as the proviso has been dispensed with in various commodity Standards Orders issued recently in respect of mustard, self-raising flour, shredded suet, and baking and golden raising powder.

4. The Ministry of Food have appointed an Advisory Committee, including public analysts, to make recommendations as to food standards, and this Committee will doubtless have regard to the recommendations of the Departmental Committee on the Compositions and Descriptions of Food which issued its Report in 1924.

5. An important addition is that false description of food is not confined to the nature, substance or quality of the article, as it will now be an offence to falsely describe the nutritional or dietary value of food. It will also be an offence to publish an advertisement which falsely describes an article of food, and the Minister of Food may also issue an order to restrict the making in advertisements of food of claims or suggestions of the presence in food of vitamins or minerals. It would be interesting to know exactly why it has been laid down that it is only intended that the Minister should issue an order if it appears to him to be necessary for the efficient prosecution of the war.

In a Circular (FSL 2/43) to local authorities the Ministry of Food suggests that wherever possible proceedings shall be instituted against the person primarily responsible for the commission of the offence, and not against a retailer whose guilt may be only of a technical nature.

This is a useful provision and should eliminate the unfair treatment meted out to retailers in the past, where it was the practice to proceed against the retailer first and to rely upon him proving his warranty before proceeding against the supplier.

* Details of these are given in " Food Standards ". *Food Manufacture*, March, 1944, page 85.

REFERENCES

1. *Report of the Departmental Committee on the use of Preservatives and Colouring Matter in Food.* 1901.
2. *Final Report of the Departmental Committee on the use of Preservatives and Colouring Matters in Food.* 1924.
3. *Report of the Departmental Committee on the Composition and Description of Food.* 1934.
4. *Food Manufacture*, November, 1935.
5. " Aids to Analysis of Food and Drugs." J. R. Nicholls. 1942. *British Food Journal.* 1941-42.

(Read at a Sessional Meeting of the Royal Sanitary Institute.)

Society of Public Analysts

At the Annual General Meeting of the Society held on March 1, 1944, the following were elected Officers and Council for the coming year :

President: S. Ernest Melling, F.I.C.

Past Presidents serving on the Council: F. W. F. Arnaud, Bernard Dyer, John Evans, Edward Hinks, E. B. Hughes, G. Roche Lynch, W. H. Roberts and G. Rudd Thompson. *Vice-Presidents:* G. Hogan, B. G. McLellan, J. R. Nicholls and *ex-officio* W. Gordon Carey (Chairman, North of England Section) and A. R. Jamieson (Chairman, Scottish Section). *Hon. Treasurer:* George Taylor. *Hon. Secretary:* Lewis Eynon.

Other Members of Council: C. A. Bassett, R. C. Chirnside, S. Dixon, R. H. Ellis, J. H. Hamence, H. M. Mason, Mrs. W. M. Matthews, Miss M. Pearson, W. H. Simmons, E Voelcker, G. H. Walker, K. A. Williams and *ex-officio* Arnold Lees (Hon. Secretary, North of England Section) and R. S. Watson (Hon. Secretary, Scottish Section).

National Bread

PROGRESS IN 1943

G. W. MARTIN, A.I.C.

IT WAS early in 1943 that the term " National " was officially adopted for our wartime bread and flour of 85 per cent. extraction, previously known as " National Wheatmeal ". The new name doubtless made some appeal to the public on patriotic grounds, but it may also have encouraged them to anticipate a greater degree of uniformity than has sometimes been found.

Even so, it would be well if the many frequently uninformed critics of the milling and baking trades realised that these two industries are, in fact, doing an excellent job of work under great difficulties. Thus both millers and bakers have to contend with such well-known evils as shortage of labour and overworked and often obsolete but irreplaceable plant, evils common to most present-day manufacturers. In addition they have had to solve many special problems as a result of the calls made upon them by the Government in the interests of the successful prosecution of the war.

85 per cent. Extraction made Compulsory

It was in order to save shipping space, and not as a sop to the clamorous wholemeal cranks, that 85 per cent. extraction was made compulsory in March, 1942. The ensuing months of that year were notable for the tremendous improvement made in the general quality of flour and bread, as judged by average consumer standards. One has only to recall the comparatively dark, dirty-coloured, unpalatable, branny bread of early '42 and the much whiter and more appetising loaf available a year later, and also to-day, to appreciate just how successful the millers and bakers have been in their efforts to both serve the country and please the public.

For 1942 most of the credit must go to the millers, for it was improved milling technique which brought about the elimination of both coarse, branny particles and the very fine bran powder which had such a damaging effect on the baking quality of the flour, and particularly on the size and colour of the resulting bread. Also it must be remembered that these great improvements, which resulted, for example, in the fibre content of the flour falling from about 0·9 to 0·5 per cent., were achieved without any loss of nutritional value, such as a decrease in the vitamin B_1 content of the National Loaf.

Coming to the year under review, it would seem that the bakers should get the most credit this time, since the outstanding changes in National during 1943 have been the inclusion of non-wheaten products, commonly called diluents, together with a much greater proportion of home-grown wheat, and these have probably called for even more ingenuity in the bakery than the mill.

Diluents

The Ministry of Food first announced in March that diluents, comprising oats, rye and barley, were being added to National Flour. It was then thought that the total percentage was to be only 5, but this was soon doubled. Also these three cereals have been used in varying proportions in different parts of the country, presumably according mainly to local available supplies.

The oats were used in the de-hulled form of groats, and had by far the most damaging effect on loaf quality, in that they reduced the size of the bread and gave it a rather coarse, unpleasant greyish-coloured crumb, so much so that it is believed their use has now been discontinued.

By comparison, barley and rye may be regarded as more neutral diluents, in that in small quantities they do not have a definitely harmful effect like oats. Even so they do, of course, lower the baking strength of the flour and make it more difficult to produce a good loaf. During the latter part of 1943 the percentage of these diluents has been gradually decreased, first to 7½ per cent. and now to 2½ per cent., while the proportion of English wheat has been increased by like amounts.

Potato flour has frequently been mooted as a further prospective diluent, but it is believed that supplies of a sufficiently refined and suitable type of this product are far too limited to make its inclusion in National likely in the near future.

Home-Grown Wheat

The soft home-grown wheat is very variable, its quality depending largely on the weather during harvesting. With the present rather inadequate drying plants a wet harvest season usually means poor quality and perhaps sprouted wheat, which spells trouble in the bakery and often a soggy loaf, since it is difficult to bake out properly.

In pre-war times, when the millers' grist contained, say, not more than 20 per cent. of English wheat, any such faults and variations were usually masked by the much higher proportion of stronger wheats, but with the present very high proportion of English it is obvious that any big variations in it will also be evident in the resulting flour. Again, in order to save transport, the mills generally draw their supplies of English as far as possible from the surrounding counties, so that a bad harvest season—as, for example, in the south-west this time—can be expected to result in a poorer quality flour and bread being available in that area, compared with districts which enjoyed a good harvest.

Also it must be remembered that in this country wheat is produced in small lots by thousands of small units, different farms growing different varieties, etc., whereas the imported wheats are grown on a very much larger scale. Compared with the bulk shipments of graded wheats from abroad, English wheat consequently reaches the mills in small variable parcels, and is probably the main cause of variation in the present National.

As the present season's crop of English became available the proportion was gradually increased to the present minimum of approximately 60 per cent., and bakers' troubles may be said to have increased accord-

ingly. In fact, it is unfortunately true that, despite all the miller can and is doing to produce a uniform flour, the baker sometimes still has to contend with big variations in this, his main raw material.

Baking Quality and Bread Faults

Probably, as originally indicated, the main justifiable criticism levelled against the National loaf during the last few months has been its lack of uniformity. This has applied not only to the bread made in different parts of the country, in which case, of course, local fads and fancies for a particular type or shape is a contributory factor, but more particularly has the public and the trade been concerned with the frequent differences sometimes in bread from the same bakery. One reason for this is variations in the flour, but probably the chief cause of trouble in the bakery is the very poor tolerance of National compared with pre-war white flours, and the failure of some bakers to take adequate precautions to deal with this.

Thus National flour generally has a poor fermentation tolerance, and it is frequently found that half an hour's variation in bulk fermentation time, or a few minutes' difference in the final proof, can make all the difference between a good and a poor loaf. Again, it has been found to have a poor absorption tolerance, and ¼ to ½ gallon per sack difference in the water content of the dough often has a marked effect on the quality of the resulting bread. In short, to produce a good National loaf demands the most rigid control of times, temperatures and amounts of ingredients. This is probably one of the main reasons why, since the introduction of National, the plant bakeries, with their generally better system of control, have gained trade at the expense of those smaller bakers still relying on rule-of-thumb methods.

As far as the bread itself is concerned, both the diluents and large amount of English wheat have tended to reduce loaf volume and give a coarser and harsher crumb. It appears that to get the best results from National flour the dough should be given a fairly vigorous bulk fermentation, such as is obtained with a sponge and dough process, and the lightest possible mechanical handling after scaling. It will be found, for example, that a very severe moulder will have very adverse effects and destroy any chance of a satisfactory oven lift. Also, as previously indicated, very careful attention must be paid to the final proof. One of the commonest faults in National bread to-day is a crumb of coarse, open texture and rubbery, unpalatable nature, and frequently this is due to over-proof, in a misguided attempt by the baker to get a loaf approximating in size to his pre-war white loaf. Too much water in the dough will also give similar unfortunate characteristics, and the wise baker will resign himself to a tighter dough and lower yield of bread so long as the present high proportion of English wheat continues.

It is interesting to note that in September the Ministry of Food appointed five bakery advisers to help any bakers requiring assistance in dealing with any problems arising during the manufacture of their National bread.

Calcium

In addition to the diluents, National flour also contains chalk in the form of *creta præparata* at the rate of 7 ozs. per 280-lb. sack of flour and 2 lbs. per sack of dried milk powder. Both additions are made on nutritional grounds, and have no effect on baking quality or the actual bread.

It must be remembered that ordinary wheatmeals such as National, and particularly so-called "wholemeals" of higher extraction, are not quite the elixir of life which their more ardent advocates would have us believe. In particular, they contain far too much phosphorus in the form of phytic acid, which has the unfortunate property of rendering non-available not only the already far too small amount of calcium present in such flours, but also much of the calcium normally derived from other foods. It should be noted that by comparison white bread does supply a small but significant amount of calcium. It is to correct this very unfavourable calcium/phosphorus ratio that *creta præparata* is added to National.

The necessity for supplementing such high extraction flours with calcium has recently been demonstrated in a striking but pathetic manner in Eire, where the compulsory use of 100 per cent. wholemeal has led (*Journal Medical Assocn.*, Eire, June, 1943) to a significant increase of rickets amongst young children, so much so that the incidence in Dublin is now described as "very high". The Irish rate of extraction has recently been reduced to 85 per cent., presumably as a result of this unfortunate happening.

Fortification

This question of the fortification or enrichment of our bread is likely to be a very vexed one in the immediate post-war years. It will be remembered that for a few months immediately prior to the introduction of National wheatmeal the then white flour was being fortified with vitamin B_1 in the form of aneurin, added at the rate of 0·2 gramme per 280-lb. sack of flour. This brought the B_1 content of that white bread almost to the level of the present National.

More recently the U.S.A. has adopted a much more comprehensive policy of bread enrichment, the addition of aneurin, nicotinic acid, riboflavin and iron being compulsory, while calcium and vitamin D are optional.

Compared with this, Canada has strenuously opposed the inclusion of synthetic vitamins or minerals in its bread, and has attacked the problem from the angle of trying to conserve as much as possible of the naturally occurring vitamins by altering milling procedure. In this way the so-called "Canada approved" flour has been produced, which is of 78 per cent. extraction, has an alleged B_1 content of about 0·8 I.U. per gram, compared with an average of 1·0 I.U. per gram in our National, and, most important to the public, produces a loaf which is, to all intents and purposes, white.

This Canadian policy would seem to have much to commend it, and, it is believed, has met with some approval in this country. Certain it is that a very large body of scientific opinion supports the view that it is far better to modify and improve food manufacturing processes with the object of conserving natural nutriments, rather than adopt the easier course of making wholesale additions of synthetics to replace those lost in processing.

Since bread is such a universal food and is eaten in relatively large quantities, it is the food to which any "expert" naturally turns who wishes to increase the general consumption of any particular nutrients.

Herein lies a grave danger that one day the people's bread may become a horrible chemical concoction.

It is suggested that in any future bread fortification policy the following principles should therefore be considered. No addition should be made to bread unless it can be clearly shown that there is not only a serious deficiency of that particular nutrient in the average diet, but also that the deficiency has occurred through loss of that nutrient during the conversion of the wheat into bread in the mill and bakery. In other words, bread should not be made the willing horse bearing the nutritional burdens of other industries. Secondly, the addition should have no harmful effect on the baking quality of the flour; and finally it is suggested that all such additions should be made to the flour at the mill, and not in the bakery, in order to ensure standardisation. In this last connection it may be noted that in the U.S.A. the responsibility for enrichment rests with the baker, not the miller, although, of course, much fortified flour is made.

Also it would be well for our future legislators to always keep in mind, when considering the bread problem, the very marked preference of the general public for a white loaf. Thus in pre-war days, when the public had a free choice, about 92 to 93 per cent. of the bread consumed was white. Again, it must be remembered that, despite all the publicity of the Ministry to boost the early National loaf, the public refused to be converted, even by such patriotic appeals, and continued to buy white bread while still available, with the inevitable result that National was made compulsory.

Future Developments

From the foregoing it will be seen that bread manufacturers will be confronted with many problems even when the war is over, but the lessons learnt and experiences gained with National should prove invaluable. It is a pleasing sign of recognition by the baking trade of the debt owed in the past to scientific research, and appreciaton of the fact that the future development of the industry must be increasingly dependent on technical knowledge, that over £25,000 has been collected with a view to the establishment of a Bakery Research Association.

Finally, what of the immediate future? Obviously any decision on a matter of such import as the people's wartime bread must be reserved for the highest authorities, but it does appear that a reconsideration of the present rate of extraction of the flour may deserve serious attention in the not too distant future.

It is well known that it is the last 3 to 5 per cent. of the present 85 per cent. extraction which has by far the most damaging effect on loaf quality, and it is believed that, given a flour of, say, 81 per cent. extraction, the baking trade could be relied upon to produce a more consistent, attractive and palatable loaf. Such a loaf would be bigger, whiter and more easily masticated than the present-day one, and it seems reasonable to assume that it would result in the elimination of much of the present waste of poor bread.

Again, such a reduction to 81 per cent. extraction would, of course, free a further 4 per cent. of weatings for animal feeding stuffs, and at a time when these are in very short supply. It is surely better to feed this 4 per cent. of offal direct to animals, thereby increasing milk and meat supplies, rather than to go to the trouble and expense of first converting it into bread before the poultry and pigs get much of it illegally.

A Food Concentrate from Distillery Residue

In modern distillery operation the starch-free residues of grain remaining after fermentation and distillation are concentrated, dried and marketed as feeds for cattle and poultry. These by-products of alcohol manufacture are valuable protein and vitamin concentrates. Potentially they are also human food products containing many essential nutrients in concentrated form.

The development of human food from these products requires the removal of several impurities as well as the improvement of general quality and palatability. A process for production of a highly nutrient as well as palatable food from distillery residues has now been developed, and was described by N. R. Joseph, A. F. Novak and J. K. Woods in a paper read before the American Chemical Society. The method employed is microbiological in nature and depends on the growth of yeast on the residues. Nitrogen in the form of ammonia is added and is nearly quantitatively converted to yeast proteins in the process of yeast growth.

In this method ammonia in a quantity slightly higher than 2 per cent. by weight is added to the crude residues. Small amounts of phosphoric acid and other inorganic constituents are also added. The mixture is inoculated with yeast and is aerated for about twenty hours at 90° F. At the end of that time the mixture is ready for evaporation or drying. Analysis of the resulting products shows that nearly 90 per cent. of the added nitrogen is converted to protein. This corresponds to a synthesis of 1 lb. of yeast protein to every 10 lbs. of residue, or the production of 2 lbs. of yeast in the same mass. The ammonia required for the production of this pound of protein is about 2½ ozs. Only about a tenth of this ammonia remains unconverted. Expressed in other terms, the protein increase is about 30 per cent. of the original protein.

In the process of yeast growth approximately 20 per cent. of the mass of the residue is converted into yeast cells. This produces profound changes in the residues. About half this non-nitrogenous material is converted to protein; the other half into glycogen, fats and the other non-nitrogenous constituents of yeast. In this way objectionable organic acids, such as acetic and lactic acids, are removed by conversion to nutrients. The palatability and general food value are thereby increased.

Yeast is an excellent source of vitamins, especially of the B group. The growth of yeast is attended by a proportional increase of vitamin content. Analyses have proved that the various vitamins are increased by factors of 50 to almost 100 per cent. Summarising, the process results in an increase of proteins in distillers' by-products by 30 per cent., an increase of vitamins by 50 to 100 per cent., and the removal of quantities of organic acids.

Because of wartime conditions, the requirements of high-protein foods have been greatly intensified. The method here reported results in the quantitative conversion of ammonia to protein, 1 lb. of the former producing between 5 and 6 lbs. of the latter. This protein is of high quality, being richer in essential amino acids than most of the common vegetable proteins. Nutritional experiments with animals are being carried out in parallel with the studies of the process.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, February 1, page 50.

No.	*Date.* 1943.	
		PRICE FIXATION ORDERS
1525	Oct. 28.	Order, amending the Potatoes (1943 Crop) (Control and Prices) (No. 2) Order, 1943.
1568	Nov. 2.	Root Vegetables (Maximum Prices) Order. Revokes S.R. & O. 1943 No. 101.
1584	,, 6.	Citrus Fruit (Maximum Prices) Order. Revokes S.R. & O. 1940 No. 1903; 1942 Nos. 418 and 2070; and 1943 No. 45.
1587	,, 8.	Order, amending the Milk (Maximum Prices) (England and Wales) Order, 1943.
1593	,, 9.	Fish Cakes (Maximum Prices) Order. Revokes S.R. & O. 1942 No. 2622 and 1943 No. 819.
1596	,, 10.	Sugar (Control and Maximum Prices) Order, Revokes S.R. & O. 1939 No. 1129; 1940 No. 1237; 1941 No. 2005; and 1943 No. 1215.
1614	,, 15.	Poultry (Control and Maximum Prices) Order. Revokes S.R. & O. 1941 Nos. 1701, 1907 and 2007; 1942 No. 23; and 1943 No. 1567.
1615	,, 15.	Poultry (Control and Prices) (Northern Ireland) Order.
1642	,, 20.	Rhubarb (Maximum Prices) Order.
1649	,, 22.	Order, amending the Fish (Maximum Prices) (No. 2) Order, 1943, and revoking the Immature Sea Fish Order, 1942, as amended.
1653	,, 23.	Bread (Control and Maximum Prices). (No. 2) Order.
1681	Dec. 7.	Order, amending the Carrots (1943 Crop) (Control and Prices) (No. 2) Order, 1943. Revokes S.R. & O. 1943 Nos. 39, 392 and 984.
1682	,, 7.	Order, amending the Root Vegetables (Maximum Prices) Order, 1943.
1706	,, 14.	Invert Sugar (Maximum Wholesale Prices) Order. Revokes S.R. & O. 1940 No. 2197 and 1942 No. 767.
1707	,, 14.	Glucose (Control and Maximum Prices) Order. Revokes S.R. & O. 1940 No. 848 and 1941 No. 510.
1719	,, 15.	Order, amending the Onions (Distribution and Maximum Prices) Order, 1943.
		FEEDING STUFFS
1691	Dec. 9.	Order, amending the Feeding Stuffs (Rationing) Order, 1943, and the Directions, October 23, 1943, supplementary thereto.
1738	,, 18.	Order, amending the Feeding Stuffs (National Priority Pigeon Mixture) Order, 1943.
		FISH
1657	Nov. 25.	Fish (Port Allocation Committees) Order. Revokes S.R. & O. 1942 Nos. 1981 and 2273; and 1943 No. 227.
1731	Dec. 17.	General Licence. Now spent.
		KITCHEN WASTE
1782	Dec. 29.	(Licensing of Private Collectors) (Amendment) Order.
		LOCAL DISTRIBUTION
1770	Dec. 31.	Order, amending the Food (Local Distribution) Order, 1943.
		MILK
1566	Nov. 1.	Directions, supplementary to the Milk (Control of Supplies) Order, 1942 and the Milk (Control of Supplies) (Scotland) Order, 1942. Revokes S.R. & O. 1943 No. 1056.
		PEPPER
1745	Dec. 21.	Pepper Order. Revokes S.R. & O. 1941 No. 1852; 1942 No. 569; and 1943 No. 111.
		POINTS RATIONING
1690	Dec. 9.	Order, amending the Food (Points Rationing) (No. 3) Order, 1943.
		POULTRY
1656	Nov. 25.	Poultry (Control of Sales of Stock Poultry in December) Order.
1751	Dec. 22.	Order, amending the Poultry (Control of Sales of Stock Poultry in December) Order, 1943.
		TRANSPORT
1567	Nov. 1.	Turkeys and Geese (Prohibition of Transport from Northern Ireland) Order. *See S.R. & O.* 1943 *No.* 1614 *under Price Fixation Orders.*
1633	,, 18.	Green Vegetables Transport (Cornwall) Order.
1634	,, 18.	Broccoli (Heading Type) Cauliflower, Spring Cabbage and Spring Greens Direction. [1939 No. 927, Reg. 55.]
1639	,, 20.	Direction. [1939 No. 927. Reg. 55.] Revokes S.R. & O. 1942 No. 2560.
1675	Dec. 4.	Food (Sector Scheme) Order. Revokes S.R. & O. 1942 Nos. 1656, 1800 and 2204; and 1943 Nos. 38, 797*, 864, 1361* and 1450* as from January 17, 1944.

* In so far as they affect the Food (Sector Scheme).

Correspondence

Colour in Food

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—Whilst being rather amused in the reading of Mr. Bagnall's article, I do feel that some reply should go out to one who, while writing upon a subject that he sees from the viewpoint of a Public Analyst, rather quotes his ignorance of the Trade in food colouring and to his assumed attitude of the purchasing public.

There is rather a lot of space in the article devoted to colouring matters and to the dire results of colours very rarely, if ever, used in these days—forgotten by the Trade of those bad old days in which so much of Mr. Bagnall's article is written.

Cases of food colouring poisoning in this country are so rare when comparing the population that Mr. Bagnall has little argument to put before the public. It is doubtful whether these cases were definitely proved, but it is obvious that the colour in foodstuffs is the first " pitching spot " and any cases of disorder in the human system are straightway laid at the door of the colour manufacturer.

This all goes to prove just how very careful in handling and in their manufacture the colour concerns have to be, and in truth a standard is set by them that might be well copied by any branch of the food industry.

The argument that Mr. Bagnall puts forward is rather like suggesting to a cigarette smoker that instead of buying cigarettes for the next five years he swallows a half-ounce of nicotine at one go.

The public is deceived because it wishes to be. Just imagine everything taken at the mouth without colour except the product's natural one—if any!

I wonder whether Mr. Bagnall uses a Tooth Paste coloured pink, a Brilliantine tinted green or a Toilet Soap coloured lavender-blue. If so, I wonder just what argument he would give for buying these.

One would not insult his intelligence by suggesting that he thought the Brilliantine contained valuable properties of chlorophyll or that the soap contained some mysterious extract of the lavender plant.

His suggestion that yellow colour in cakes *means* eggs therein is totally incorrect. What it might do is to *suggest* the colour of eggs, but I have yet to find a person who thinks that he is buying an egg product in any form.

Such " colour names " as Gooseberry Green, Rose Red or Lemon Yellow, to quote a few of many, are not stated in the sale of goods to the public, and therefore to suggest, as Mr. Bagnall does, a deception, can only be interpreted as meaning that the actual manufacturer and user of the colour considers he is using some actual extract of the plant or flower. This is just as stupid as his suggestion that Preserve manufacturers use colour to mask unsound fruit.

He should know that food colour is added with far more discretion, and, whilst there are a few black sheep, the Preserve manufacturers are not in any way minded to go out of their way to deliberately cheat the public.

Apparently Mr. Bagnall's argument against colour would also incorporate the essence. We wonder what sort of a sale a Lime-Juice Tablet—naming the class of confection rather than deceiving by suggesting an actual lime-juice content—would have if manufactured with flavour and without colour, or with colour and without flavour?

No; Mr. Bagnall's arguments are without depth and have taken into account so much data over so much time that he has achieved a result that shows that food colour, if it does little good, does so very, very little harm when one compares food with colour in the medicinal trade, that the subject might well be allowed to drop in favour of far more important things in our daily lives.

In any case, it is rarely the actual manufacturer who has been to blame but someone else who has *combined* the trouble.

When one weighs up the subject there is so much pleasure in food colouring that one can feel the purchasing public crying out should this pleasure be taken from them for, shall we say, a " wholesome, colourless, vitamin-pumped and *unpalatable* food ".

We have few pleasures left, please leave us this.

Yours etc.,

E. R. LEADBETTER.

Isleworth, Middlesex.

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—After reading Mr. Bagnall's article and Mr. McLachlan's reply, I feel your comment at the head of the article does not do justice to the differences of opinion expressed by these gentlemen.

Mr. McLachlan wisely takes the last paragraph of Mr. Bagnall's paper first, as " no reasonable person is likely to disagree ", but surely this paragraph is, in its reasonableness, out of step with the rest of Mr. Bagnall's article.

To assume that making a product more attractive is to adulterate it, or that an addition of colour is generally made to deceive the purchaser into believing that the article contains something which isn't there, shows a woeful ignorance not only of commercial practice, but of the real value of attractive appearance in foods.

Mr. McLachlan is much more reasonable in his outlook and brings much sound common sense into his arguments, without losing sight of the responsibilities of Public Analysts and manufacturers alike to the public.

The articles to my mind raise a much larger issue than " Colour in Food ".

Surely, sir, those who now press for food legislation of various kinds are concerning themselves with relatively insignificant details and losing sight of the main problem. Any discussion on food standards invariably centres round such products as lemon curd, soft drinks, biscuits, jam, custard, etc. If anyone buys these or similar products for purely utility or dietetic reasons, their dietetics or their economics are sadly at fault. We buy soft drinks, dessert preparations and even jam because we like them, and not to obtain vitamins or even direct food value. If we standardise all such foods, will the public on the whole gain anything?

Definite policy and some standards are advisable for

the really important foods like milk, bread, butter, margarine and certain products which claim special dietetic value, but Heaven forbid we should be denied our sweets, jellies and blancmanges or even have to take them uncoloured, because they do not contain vitamins or have not been made according to Mrs. Beeton.

To go completely totalitarian in food matters will result in a general reduction in quality and a loss to the public of cheap but wholesome foods. A little bit of what you fancy does you good, and a well-balanced life will result from knowledge and training, not from regimentation.

Therefore, as we now have a food policy let us have legislation on vital matters and (perhaps even more important) educate the people to a correct appreciation of food values. The Ministry of Food has made a start in both these directions, but there is still much ground to cover. There is so much work of real importance to be done that we cannot afford the time to worry about " trifles ".

Yours faithfully,
J. M. TUCKER.

London. *Wheta, Ltd.*

Pork Products

TO THE EDITOR OF FOOD MANUFACTURE

SIR,—I believe your editorial on " Pork Products " in last month's issue to be a gross misstatement and that it would have been more accurately rendered as follows :

The improvement which takes place this month in the pork content of sausages is in no way due to the effect on the pig population of the double ration of feeding-stuffs issued to farrowing sows. That increase took effect on January 1. A certain amount of imported pork unsuitable for bacon production will continue to be allocated to food manufacturers. The higher food value and better flavour of the new sausages cannot, however, make any material difference to the demand as it is already so much in excess of supply, and it is doubtful whether the Ministry of Food would wish to increase the quantity as well as the quality of sausages if at the expense of bacon production.

The full effect of the feeding-stuffs concession on the pig population will not begin to become apparent in the industries concerned, to any appreciable extent, for about twelve months. For some time past all the home output of pigs suitable for curing has been converted into bacon, but even with Canada continuing to supply about four-fifths of Britain's bacon requirements, the Ministry will require for curing as many home-produced pigs as possible this year if it is to maintain the ration, and it is believed in trade circles that only those pigs quite unsuitable for curing will be used for other purposes. There is therefore little hope of any appreciable change in the share of the pig supply devoted to the meat ration.

Few, if any, of the pigs used for that purpose would be as suitable for curing as those finding their way to the bacon factories. The wartime baconer varies from 5 to 14 scores and averages something less than 10 scores, which compares with the pre-war ideal of 7 to 8 scores. The present heavy-weight pigs contain on average much the same proportion of fat, and in modern mild-curing factories the minor technical problems they raise are comparatively easy to overcome.

The national food position is in some ways better than it was a year ago. Improvement in the quality of sausages and other pork products is not, however, likely to be allowed to interfere with the output of bacon even of wartime standard.

Yours faithfully,
C. E. B. BRETT.

Cobham, Surrey.

Commercial Refrigeration Industry

IN a speech to the Commercial Refrigeration Association at their first annual luncheon recently, Mr. E. G. Batt, independent chairman, divided his remarks into two headings. The first referred to the work done by the commercial refrigeration industry up to the present time. The industry, he said, had been in existence for a very long time and had achieved immense process in design and production. Until a comparatively recent date no organisation existed under whose ægis the firms concerned could meet to discuss matters that concerned the industry as a whole. In 1940 the " Old C.E.R.A. ", as it is now generally called, was formed. It has now some 220 members, and has established most cordial relationships with the Government departments with whom it is concerned.

The second part of Mr. Batt's speech dealt with the future. He said that, even when hostilities cease, the controls established under wartime conditions will, unless modified, continue in force. In the immediate post-war period a certain degree of control would be essential, but the powers of control to be exercised for peacetime reconstruction must be directed to an entirely different purpose, and differently applied, from wartime controls.

During war controls are co-ordinated to give maximum production for the requirements of the Government. In peacetime the public replaces the Government both in the home and export markets, demanding vast and diversified tastes and requirements. As soon as the special transitional conditions between war and peace disappear the case for Government control dwindles.

Regarding prices, Mr. Batt said that the common criticism directed against minimum price agreement is based on the assumption that they are monopolies. It is fallacious to argue that all minimum price agreements must be invariably contrary to the national interest.

Bulk buying is wrapped up with the question of price. It is suggested in certain quarters that the principle of bulk buying by Government departments is to be part of the post-war scheme, but there was no necessity whatsoever for any interference.

On export, he said that at no other time has there been a greater responsibility on exporting manufacturers to make an intensive study of their jobs. Overseas manufacturers must be represented by trained and qualified individuals.

The need for the future, he concluded, is for the creation of a practical system of co-operation between Government and industry.

Food Analysis

PART II

PROGRESS IN 1943

D. W. GROVER, B.Sc., A.I.C.

Fats and Oils

THE application of absorption analysis to the analysis of mixtures of fats and fatty acids is the subject of two papers.[37, 38] The "retardation volumes" of trilaurin, trimyristin, tripalmitin and triolein solutions in either have been determined, using the Tiselius method described earlier,[4] the absorbent being carbon. The difference between the triglycerides is sufficiently great to enable a qualitative analysis to be carried out. Similar results were obtained using a column of heavy magnesium oxide, for the separation of high fatty acids.

Prolonged heating of fats during saponification with alkali has been observed to cause the non-conjugated double bonds in certain unsaturated acids to become conjugated and thereby give rise to absorption of ultra-violet radiation. The acids affected are those containing more than one double bond—*e.g.*, linoleic and linolenic acids. This fact has been used as a means of analysing mixtures containing these acids, spectral analysis being performed in an ethyl alcohol solution of the soaps using light of 234mμ.[39] Quantities of linoleic and linolenic acids in fats may be accurately determined when interfering acids are absent.

The use of **mercuric acetate** as a catalyst for rapid iodine number determinations with Wijs solution is not new. Recent experience with this reagent shows that only three minutes' reaction time is required, but that the reagent is unstable.[40] A Hanus solution similarly catalysed gives accurate results except where conjugated double bonds are present in the fatty acid molecule.

Where only a small quantity of material is available for analysis a new "two indicator" method for determining the **saponification number** may prove useful.[65] It is based on titrating the solution containing soap and excess alkali, after saponification is complete, with acid, the difference between the phenolphthalein and bromophenol blue end-points being equivalent to the total fatty acids. Benzene added to the titration flask to remove liberated fatty acids adds considerably to the sharpness of the final end-point.

Fermentation Products

A potentiometric method for determining the fixed and volatile acidities of **distilled spirits** was described in 1940. Experience of applying this procedure to the analysis of whisky and brandy, using a glass electrode for the titration, has further defined the best conditions for obtaining accurate results.[41] The alcohol content should be kept below 10 per cent. Dilution does not greatly affect the titration. The limits of error are $\pm$0·5 per cent. in the total acid, $\pm$2 per cent. in the fixed acid and $\pm$0·3 per cent. in the volatile acid. If indicators are used for the titration, the errors are larger ($\pm$25 per cent. on the fixed acid with phenolphthalein), α-naptholphthalein being preferred owing to its greater colour contrast.

No. 52 Lovibond coloured glasses, which are so convenient for the measurement of the **colour of beer**, whisky, etc., have now been standardised spectrographically, using light of wavelength 430mμ.[42]

Diastases of different origins—animal, malt and bacterial—differ in the relative rates at which they cause the three stages of starch breakdown: liquefaction, conversion to dextrin and conversion to maltose. This leads to some difficulty in comparing the enzymatic power of various preparations. Ways of overcoming this by comparing the preparations with a standard pancreatic enzyme are suggested in a recent article.[43] There is no need always to use the same starch substrate.

A simple test for the detection of **caramel in wine** consists of adding to 25 c.c. of the sample 50 c.c. of 95 per cent. alcohol and 50 c.c. of ether. If two layers form after shaking and allowing to stand, more alcohol should be added. Caramel is precipitated, and after standing overnight may be filtered off, washed and tested.[44]

Glycerol in Wines may be determined by means of the periodic reaction. Isolation is first effected by clarification with lead acetate and barium hydroxide under such conditions that the sugars are precipitated as barium saccharates. The glycerol is then concentrated, oxidised with periodic acid and excess reagent determined iodometrically.[45]

Flavouring Materials

Methods for detecting **adulteration of vanillin** with ethylvanillin have been available for some time. A test described by Nechamkin[6] now makes it possible to detect the adulteration of ethylvanillin with the much less expensive vanillin: at least 1 mg. in 25 mg. of sample is required to give a positive test. Coumarin does not interfere.

Where a large number of **peppermint oils** have to be tested for menthol content, a very great saving of time should be possible by the application of the new method of Swift and Thornton.[47] It is based upon the fact that the viscosity of an oil is largely dependent on its content of free menthol. Results within $\pm$1·5 per cent. of the true figure can be calculated for fresh oils. An interfering substance, which also tends to increase the viscosity, can be corrected for by observing the turbidity caused by this same substance when the oil is dissolved in diluted alcohol.

The formation of a coloured reaction-product of capsaicin with vanadium oxychloride is the basis of a chemical test for the **pungency of peppers.**[48] The dried ground fruit is extracted with ether and a 1 per cent. solution of the reagent in chloroform is added dropwise until no further green colour is developed. Sweet peppers give a negative test, while hot peppers vary from yellow to dark green. As a colour standard a mixed solution of malachite green and naphthol yellow is used.

A **test for saccharin,** capable of detecting 1 part in 2,000, is the formation of a microcrystalline precipitate with fresh cobalt-ammonia solution.[49]

The suitability of various glycols as solvents of food flavours, in relation to their toxicities, has come in for considerable study recently. Methods for examining **mixtures of glycols** are therefore of value to analysts. Two discussions of the use of periodic acid for this purpose have been published during the year.[50, 51] Both are based on the examination of the various end-products of the reaction. The oxidation of ethylene, propylene, diethylene glycols and glycerol results variously in the production of formic acid, formaldehyde, acetaldehyde, etc. The estimation of these, together with the excess periodate, enables calculations of the composition of the mixture to be made.

Some doubt is thrown on the reliability of crude fibre as an estimate of shell in **cocoa products** by an investigation of Rheinlander and Field.[61] The shell consists of various layers of different compositions which tend to become separated during processing. Lighter fractions, although almost free from nib and germ, have been found to contain only 9·5 per cent. of fibre on the fat-free basis compared with the usual figure of 20·5 per cent. Alternative proposals are made such as direct microscopic estimation and determination of cocoa starch, the former being the more promising. Examination of the quantity and constants of shell fat suggest that many previously investigated samples of shell have been contaminated with nib. A slight modification of the A.O.A.C. method for phenolphthalein in chocolate results in saving of time.[64] It is estimated gravimetrically as tetraiodophenolphthalein.

The suitability of **almonds as food** is related to the amount of hydrogen cyanide which is produced on the autolysis of the glucoside, amygdalin. A method for estimating this consists of autolysis followed by aspiration with air over a strip of congo red, silver nitrate test-paper.[62]

Official methods for the purposes of enforcing the **Cake and Flour Confectionery Order, 1942,** have now been published.[63] Sugars are determined by copper reduction before and after inversion and fat by a modified Werner-Schmidt method.

Preservatives and Colours

The direct estimation of **sulphur dioxide in citrus juices**—that is, determination without distillation—is possible if due account is taken of the combination which occurs between sugars, etc., and sulphur dioxide, "fixing" the latter, and of the presence of other reducing substances, notably ascorbic acid.[52] Direct titration with iodine gives the free sulphur dioxide plus natural reducing substances. Titration after treatment with alkali gives the total sulphur dioxide plus natural reducing substances, while titration after boiling off the sulphur dioxide or combining it with acetone gives the natural reducing substances only. What purports to be an improvement of the Monier-Williams method for sulphur dioxide as applied to beer is published by Nissen and Peterson.[53] Two modifications are proposed. (1) Neutralising the hydrogen peroxide with sodium hydroxide instead of with barium hydroxide before the distillation, on the ground that any excess of barium causes the precipitation of an equivalent of barium sulphate and so reduces the final titration. This argument is surely false. If barium is present in the original neutralised solution it must be combined with some acid. The precipitation of any barium sulphate must therefore liberate an equivalent of this acid and cannot affect the final titration. (2) Heating the hydrogen peroxide, into which the sulphur dioxide has been distilled, with barium chloride to assist the precipitation of barium sulphate. This is specifically avoided in the original method because it is liable to oxidise other sulphur compounds and give rise to a high value.

A recent group separation of **food colours** is based primarily on solution in mixed solvents.[54] Preliminary separation into six groups is possible by extracting from alkaline and acid aqueous solutions with, in turn, ether, amyl alcohol and chloroform. Two other groups are obtained from water insoluble dyes, one by dissolving in dilute caustic soda and extracting with ether and the other by boiling with benzol. The individual members of the groups can be examined, for example, by absorption analysis. Convenient tests have been proposed for the identification of Yellow AB and Tartrazine.[55]

Trace Elements

Two improved methods for **boron** have been published this year in *The Analyst*. Dickinson[56] suggests the replacement of quinalizarin as a colorimetric reagent by alizarin-S and the use of colour standards consisting of, for the former, a mixture of phenolphthalein and thymol blue, and for the latter, methyl orange. The sample is ashed at 480° and 520° C., good recovery being obtained provided the ash is alkaline, dissolved in dilute sulphuric acid and treated with alizarin-S dissolved in concentrated sulphuric acid, the exact strength of the latter having a considerable effect on the colour produced. Results correct to 2 parts per million on 0·5 gm. samples are obtained. Only germanium behaves similarly to boron. Fluorides interfere only if present in large quantities. Beckett and Webster[57] utilise a somewhat similar colorimetric method, their reagent being a sulphuric acid solution of 4 : 4′ – diamino – 1 : 1′ dianthraquinonylamine with which the boron, also in sulphuric acid, is heated at 150° C. The colour produced is estimated using light of 620mμ, under which conditions the change in optical density is proportional to the quantity of boron.

A new coloured complex which may prove suitable for the estimation of traces of **copper** is the intensely brown cuprous phenanthroline compound.[59] Cadmium, cobalt, nickel and zinc interfere. Increased accuracy over existing methods for estimating phosphorus by means of the molybdenum blue colour is obtained by reduction with hydriodic acid.[60]

(*Continued on page* 139)

British Material for Export

Overseas readers are advised that the fact that goods made of raw materials in short supply owing to war conditions are advertised in FOOD MANUFACTURE should not be taken as an indication that they are necessarily available for export.

Fluorescence Analysis in the Food Industry

PART IV

J. A. RADLEY, M.Sc., F.I.C.

THE EXAMINATION OF ORGANIC COMPOUNDS

BESIDES the information obtained by direct examination under the lamp, organic substances are very amenable to simple chemical reactions which give fluorescent end products. A number of these are of interest to those connected directly or indirectly with the foodstuffs industry.

A number of preservatives give good results by fluorescence examination; for example, extracts from foodstuffs suspected to contain benzoic or salicylic acids can be made alkaline with caustic soda solution when blue and violet fluorescent solutions, respectively, are obtained. A number of preservatives are salicylic acid derivatives or else derivatives of beta naphthol In such cases the compounds are hydrolysed by the usual methods, and the hydrolysed material made alkaline with caustic soda and examined under the lamp.[237, 239] Beta, but not alpha, naphthol dissolved in a mixture of equal parts of glacial acetic acid and sulphuric acid gives a green fluorescence in the presence of 1 part in 100,000[238]

Artificial Sweetening Preparations

The presence on the market of many artificial sweetening preparations gives interest to the fluorescence tests for dulcin and for saccharine. Dulcin is detected[240] by heating 10 mgm. of the sample for 2 mins. at 180° C. with 10 mgm. of freshly sublimed resorcinol and 2 c.c. of strong sulphuric acid. After cooling, the solution is divided into two portions and made alkaline with caustic soda solution, and ammonia. The first portion shows a reddish brown fluorescence, and after 10 minutes the ammoniacal portion a violet fluorescence. This test gives positive results when dulcin is present to the extent of 1 per cent. in sacharin. The latter can be detected by treatment with sodium hydroxide solution when an intense bright violet fluorescence is obtained. Heated with resorcinol and strong sulphuric acid, cooled, diluted and made alkaline, saccharin gives a solution having a weak orange red colour with an intense green fluorescence due to sulphofluorescein. This test is not specific for saccharin as barbituric, phthalic and other related acids also give it, but when these are known to be absent the test is quick and sensitive.

Glycerol has been used in sweetening agents and as a solvent for various colouring and flavouring agents. In the author's opinion the best fluorescence test for this compound is to extract it by any method suitable to the substance being handled, evaporate the extract gently and add a 1 per cent. solution of anthrone in concentrated sulphuric acid. This solution should be freshly made up as it only keeps for a few days. On heating the mixture to 160° C. for a few minutes an orange brown fluorescence develops in the presence of only 1 part of glycerine in 100,000 parts of solution. This fluorescence is visible in daylight, but under the lamp an intense golden yellow fluorescence is seen. Diluting the mixture with an equal volume of water assists in making the observations more sensitive when minute amounts only are present.

Formaldehyde dissolved in ethanol, to which is added a solution of naphtho-resorcinol in hydrochloric acid, gives a blue fluorescence when present to the extent of 1 part in 500,000, whilst glyoxal under these conditions gives a blue-green fluorescence.[241]

Sugars

In C. Dhéré's test for *fructose*,[242, 243] the sugar is warmed with resorcinol and strong hydrochloric acid, the red precipitate dissolved in alcohol, sodium carbonate added, and the solution extracted with amyl alcohol. In the presence of fructose a red to green fluorescence results. There are several tests for *dextrose*, the simplest being [243, 244] to heat the sample on the water bath with 10 per cent. hydrochloric acid for some time, then to make slightly alkaline with caustic soda, when a yellow-green fluorescence is obtained. This test is not particularly sensitive, and a better one appears to be that in which the sugar is heated with hydrochloric acid and a small quantity of orcinol.[242, 243] A yellow-red colour develops which dissolves in alcohol to give a green fluorescence. Fluorescence tests are also known for *levulose*, *arabinose*, *rhamnose*, *aldoses* and *methyl pentoses*, but need not be mentioned here, while the author has noted elsewhere[1] that Cayaux's method for the detection of *sucrose* in milk is amenable to fluorescence analysis and can be used to detect sucrose in other substances.

Cholesterol and Related Compounds

In view of the interest of cholesterol and related compounds to the food chemist, attention must be drawn to a few of the fluorescence tests for these compounds. *Cholesterol* itself is detected by the red colour with a green fluorescence which develops on shaking its chloroform solution with an equal volume of concentrated sulphuric acid.[243] Heated with a 90 per cent. solution of trichloracetic acid, cholesterol gives a green fluorescence, changing to blue in 24 hours, whilst in Tschuggern's test, which has a sensitivity of 1 : 80,000, a red colouration and green fluorescence develops when this compound is warmed for 5 minutes with acetyl chloride, zinc chloride and glacial acetic red.

Isocholesterol dissolved in warm acetic anhydride,

cooled, one drop of concentrated sulphuric acid added and examined shows a green fluorescence.[245] *Irradiated ergosterol*[247] is detectable when present to the extent of 0·001 mg. per c.c., according to Bruckner,[248] by the following test: Dissolve sample in 2 c.c. benzene, add 1 c.c. of acetic anhydride, together with 0·5 c.c. acetone, 0·5 gm. anhydrous zinc chloride and a crystal of copper sulphate. A blue-violet colour with a red fluorescence develops.

Some Organic Acids

Glycollic, lactic and *malic* acids[250] react on heating with 2·7-dihydroxynaphthalene in concentrated sulphuric acid to give a red-violet, in the case of glycollic acid and yellow solutions in the other two instances. In ultra-violet light the last two compounds show a green fluorescence. The freshly prepared agent shows a green fluorescence, but this disappears on standing overnight or by heating for a short time.

Another test for *lactic acid* sensitive to 1 gamma in a limiting concentration of 1 : 50,000 is the blue fluorescence developed when the acid is heated with a crystal of o-hydroxy diphenyl and a few drops of concentrated sulphuric acid for two minutes at 85° C. on a water bath.[251] However, as the reaction depends upon the formation of acetaldehyde, which reacts with the o-hydroxy diphenyl, the test is not specific, but is given also by acetaldehyde, formaldehyde, metaldehyde, paraldehyde, aldol and the next higher homologues of the aldehyde series. Pyruvic acid, however, does not interfere, but can be detected by first testing a portion of the solution for lactic acid and aldehyde, etc., as above, then reducing the pyruvic acid to lactic acid by adding a little magnesium powder and a drop of sulphuric acid to a few drops of the test solution. At the end of the reduction a crystal of o-hydroxy diphenyl and 0·5 to 1·0 c.c. of concentrated sulphuric acid are added and the test continued as described above. Three gamma of pyruvic acid at a concentration limit of 1 : 16,666 can be detected.[250]

Malic acid[250] may also be detected by the blue fluorescence which develops when it is heated with 0·0025 per cent. solution of beta naphthol in strong sulphuric acid. Ten gamma at a concentration limit of 1 : 5000 can be detected, and the test may be used to detect the presence of apple pulp in jams. As gooseberries, raspberries, strawberries and currants have been shown by Muttelet to be devoid of malic acid which, however, is invariably present in apples, its presence in jams from the above fruits would be strong presumptive evidence of apple pulp or jelly.

Colombier takes the extract containing malic acid to dryness with resorcinol, adds concentrated sulphuric and heats for 10 minutes on the water bath. After cooling and diluting the liquid is neutralised with caustic soda and examined under the lamp. A bright blue fluorescence indicates the presence of malic acid. Celsi replaces the resorcinol in this test with orcinol, which makes the test more specific since resorcinol will also react with citric and aceto-acetic acids.

Tartaric acid[249] is detected in the presence of ten times the amount of malic acid, in any amount of oxalic or succinic acid or in 150 times the amount of citric acid by Eegriwe's test in which a few drops of the solution under test are added to a 0·05 per cent. solution of *ββ*-dinaphthol in 96 per cent. sulphuric acid and heated for half an hour on the water bath at 85° C. A strong luminous green fluorescence develops and replaces the violet fluorescence of the reagent.

Isoergosterol gives a green colour and fluorescence when its solution in chloroform is irradiated in the presence of a solution of 25 gms. of mercuric acetate in 100 c.c. of concentrated nitric acid.[246]

Primary aliphatic amines[249] or their salts when melted with fluorescein chloride give pale red coloured dyestuffs, having a yellow-green fluorescence. Similar dyestuffs are formed from amides and nitriles. The test is carried out by fusing a small portion of the sample, evaporated to dryness with hydrochloric acid, with a little fluorescein chloride and twice this amount of zinc chloride. After fusion it is cooled and dissolved in alcoholic hydrochloric acid. *For amides* the solution is *neutralised* before evaporating to dryness prior to the fusion, whilst with *nitriles* these are first saponified to amides. Both types of compound give a yellow fluorescing end product as a result of the fluorescein chloride/zinc chloride fusion. Pyrrole derivatives give blue fluorescing compounds by this procedure.

Benzylamine and ammonium chloride give yellow-green fluorescence by the method (sensitivity limit 10 gamma and 30 gamma respectively). Hydroxylamine, hydrazine, glycocoll ester and methylamine give yellow fluorescences (sensitivity limit, 20, 20, 20 and 10 gamma respectively). As aromatic primary, secondary and tertiary amines containing a methyl group give deep red or violet dyestuffs, which are, however, *non-fluorescent*,

TABLE 1.

Substance.	*Colour of Fluorescence.*		*Identification Limit (in gamma) in U.V. Light.*
	Daylight.	*U.V. Light.*	
Citric acid	Yellow	Sky blue	1
Tartaric acid	Brownish red	Dark blue green	25
Dihydroxy maleic acid ...	Red	Blue grey	15
Succinic acid	Yellow	Emerald green	5
Malic acid	,,	Light blue	1
Saccharin	,,	Greenish yellow	5
Asparagin	Dark wine red	Dark green	10

so one can distinguish between aromatic and aliphatic amines. One amine of interest to us is saccharin, which in the above test gives a red colour with a yellow fluorescence, the limit of identification being 50 gamma.

Dicarboxylic acids with the carboxyl group in the 1 : 2 position or compounds containing SO_3H and carboxylic groups in the 1 : 2 position and their derivatives, such as esters, anhydrides, imides, etc., when heated with a little freshly sublimed resorcinol and a few drops of concentrated sulphuric acid to 130° C. for five minutes, cooled, diluted with water and made alkaline with caustic soda give brilliantly fluorescing solution.[249] Peri dicarboxylic acids react similarly (see Table 1).

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(To be continued)

NOTE.—References in the text not included in the above list will be found in the next instalment.

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(*Continued from page* 136)

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Railway Demurrage on Wagons & Sheets

GRAHAM SAVILLE

AS THE war continues the need for obtaining an even quicker turnround of railway wagons and sheets has become vital. This fact is being forced on the notice of food manufacturing concerns when they find that wagons are not available for despatch or the wagons provided are not the most suitable for the required purpose. Similarly, incoming supplies are sometimes held up awaiting the sender being able to obtain appropriate transport. Food concerns can therefore assist the war effort materially by taking every step to load and release railway wagons and sheets with all possible speed.

In addition, the importance of the problem has been increased by the higher demurrage charges, their stricter enforcement and many other new developments. In spite of the efforts made by most food manufacturing concerns to release wagons, in some cases heavy demurrage is having to be incurred on account of labour shortage and other difficulties. It is as well, therefore, to understand the charges that can be made and the grounds on which relief from charges can be obtained.

Food Concerns Affected

Food concerns are particularly affected by an agreement reached between the Traders' Co-ordinating Committee, the Ministry of Transport, the Railway Executive and the Railway Managers. This agreement sets out certain circumstances which can be taken into account in requesting relief from demurrage charges.

The points outlined by the agreement are : (1) Advice notes or orders delayed or lost; (2) Disputed dates in connexion with loading and unloading of wagons, etc.; (3) Failure of firms' working arrangements owing to strikes, enemy action, breakdown of machinery, or other exceptional circumstances outside a trader's control, etc.; (4) Wagons received at destination in larger numbers than can be dealt with by the trader within the free period owing to transit irregularities; (5) Extreme stress of weather causing delay in loading or unloading; (6) Delay to loaded wagons awaiting sheets or ropes, or to sheets or ropes awaiting wagons; (7) Making up trainloads or special consignments at request of railway, resulting in delays at forwarding or receiving ends; (8) Traffic transferred to storage yards or alternative accommodation or received at destination which the consignee is in a position to accept, but to which the railway companies cannot deliver; (9) Demurrage incurred due to wagons being loaded and then refused by the railway company owing to traffic or other restrictions; (10) Export or import shipment traffic delayed; (11) Cancellation of contracts owing to emergency; (12) Difficulties in obtaining cartage or motor vehicles, owing to vehicles being commandeered by Government or Local Authorities.

The commandeering of vehicles referred to in the final clause only qualifies as a reason for relief from demurrage charges if it occurs between the ordering of the goods and the expiration of the free period for their discharge.

Food manufacturers will find that the circumstances outlined in this agreement cover the main exceptional reasons which cause delay in the loading and unloading of wagons. While these particular points have been laid down it does not prevent the food or any other industry from putting forward as grounds for relief from demurrage charges any circumstances which are peculiar to their own industry.

Demurrage Charges

As most traders are aware, demurrage charges do not commence to be charged immediately wagons are received, but certain free periods are allowed for loading and unloading. In cases where wagons are loaded, one clear day is allowed exclusive of the day the wagon is placed at the trader's disposal, and for unloading one clear day exclusive of the day of receipt by the trader of the notice of arrival of the wagon at stations, one day after the wagon is placed at the trader's disposal at private sidings or one day after arrival at ports in the case of shipment traffic. A day is normally considered to be the 24 hours beginning at 6 a.m., and Sundays and Bank Holidays are not included.

Food concerns will naturally be interested in the charges made for demurrage, and these vary according to the type and use of the wagons. The principal charges are :

For railway companies' wagons (including private owners' requisitioned wagons) with the exception of those used for the conveyance of coal, coke or patent fuel, or of iron ore, ironstone, lime or limestone for blast furnaces and steelworks.

(*a*) High capacity wagons :

Above 16 and not exceeding 20 tons, 8s. per day.
Above 20 and not exceeding 30 tons, 12s. per day.
Above 30 tons, £1 15s. per day.

(*b*) Specially constructed wagons :

Above 15 and under 20 tons, 12s. per day.
20 tons and under 30 tons, £1 5s. per day.
30 tons and up to 60 tons, £2 2s. per day.
Over 60 tons, by special arrangement.

(*c*) Refrigerator and insulated vans, £1 5s. per day.

(*d*) Other wagons, 6s. per day.

Wagons for Fuel

Food manufacturing firms are also concerned with wagons when used for the conveyance of coal, coke or patent fuel, and these charges are :

(1) Before conveyance at stations, depots, ports, docks, wharves and private sidings other than colliery sidings (except wagons referred to in 3), 3s. per day.

(2) After conveyance at stations, depots, ports, docks,

wharves, private sidings and barging places (except wagons referred to in 3), 3s. per day.

(3) Before and after conveyance.

(*a*) In the north-eastern area of the London and North-Eastern Railway Company and in Scotland.

(i) Wagons exceeding 16 tons and not exceeding 20 tons, 4s. per day.

(ii) Wagons exceeding 20 tons and not exceeding 30 tons, 6s. per day.

(iii) Wagons exceeding 30 tons, 10s. per day.

(*b*) On the Southern Railway wagons of 20 tons, 4s. per day.

All the charges given are per wagon for each day or part of a day after the expiration of the free period.

Recording Loadings

In order to assist in obtaining the fullest possible use of all available transport in the national interest, and also to effect economies in demurrage costs, food concerns should keep accurate records of the loading and unloading of wagons. The nature of such records will, of course, depend on the peculiarities of the individual firm and also the method by which the traffic is handled —i.e., over the firm's private siding, at the railway station, etc. With the unloading of wagons it will generally be found that a record should be compiled to include the following information : (1) Wagon number and owner; (2) The forwarding station; (3) The sender of the wagon; (4) Date advice of arrival received; (5) Date demurrage commenced; (6) Date wagon cleared; (7) Date wagon reloaded; (8) Number of "demurrage days" incurred; (9) Demurrage charges; (10) Remarks. In addition, many food concerns will find it advantageous to have further columns in which to record the payment of carriage charges against each wagon and also to make certain that all cartage and siding rebates are claimed and received.

It will be found essential for special comments concerning any particular wagon such as grounds for relief from demurrage charges to be carefully inserted in the "Remarks" column. The value of any records will be considerably increased if entries are made currently from telephone calls, advice notes and actual listing of wagon numbers.

Occasions may arise when a firm is of the opinion that one or more of the conditions for relief from demurrage charges referred to have not been observed in their own case; in such circumstances they have a right of appeal to the Special Demurrage Committee of the Railway Executive Committee and ultimately, should they so desire, to the Minister of War Transport.

New Standard Arrangement

Many food manufacturing concerns will doubtless be interested in the new standage arrangement for demurrage. The principal advantage to be gained by the trader under such a scheme is in avoiding the necessity for a record to be kept of each individual wagon, as wagons are then dealt with in bulk and also in obtaining credit for wagons unloaded before the expiration of the free period. This second factor is of very considerable importance in reducing demurrage costs. These arrangements are particularly applicable to firms having a continuous inwards bulk traffic, and were first applied to blast furnaces and chemical works, but are now being operated more generally.

The method by which the scheme is operated is as follows : A daily census of wagons is taken at a time agreed between the trader and the railway company. The trader gives details of the total number of wagons on hand in his sidings loaded, the total number of empty wagons supplied to order during the 24 hours, the total number of loaded wagons discharged and wagons loaded and labelled ready for the railway company. At the same time the railway company obtains details of the loaded wagons standing outside the works which the trader is unable to accept. To cover the week-end Saturday's figures cover a period of 48 hours from the agreed times on Saturday morning to Monday morning.

At the conclusion of the week a balance is made between the total wagon days of wagons standing with inwards loads, empty wagons supplied and wagons under load but not available for despatch on one part, and inwards loaded wagons discharged, and outwards loaded wagons at the railway company's disposal plus an allowance of one-third on the other part. Charges are then raised at an agreed rate per day on the excess standage which is represented by this balance.

At present the arrangements are limited to wagons of capacity of 21 tons and under, and wagons of from 15 to 21 tons are counted as 1½ wagons. Wagons over 21 tons capacity and all specially constructed wagons are excluded.

From these brief details it will be realised that these standage arrangements save considerable clerical labour both in recording and in correspondence over adjustments in demurrage charges, and it also leaves the trader to deal with wagons to suit his own convenience.

Finally, it should be mentioned that the particulars of demurrage already given refer to traffic in full wagon loads, but charges are also made by the railway companies for consignments warehoused by them which are not housed in wagons. These are based on the tonnage of the traffic and are known as warehouse charges.

Parliamentary and Scientific Committee

A REPORT has been prepared on "Scientific Research and the Universities in Post-War Britain", urging that research and the application of scientific knowledge should be promoted on a far bolder and more imaginative scale than they had been before the war. This applied to fundamental, industrial, agricultural, veterinary, medical and allied research. There should be an expansion of scientific *personnel* at the universities and technical colleges. The universities should be prepared for rapid growth in the number of students of science and technology; materials and finances should be available for the expansion of research schools; university staffs, stipends and buildings should be increased and greater assistance should be given to people already engaged in industry.

News from the Ministries

The Saccharin (Control and Maximum Prices) Order, 1944

An order has been made by the Minister of Food consolidating the Saccharin (Control and Maximum Prices) Order, 1942, No. 2455, as amended by No. 669 of 1943.

A few minor amendments have been introduced. A tolerance for the saccharin and dulcin content of sweetening tablets has been provided; provision has been made to enable a seller to make a reasonable charge by way of deposit for returnable containers when saccharin is sold in quantities of 20 lb. or more; the clauses dealing with the keeping of records have been extended and put into common form; and an exception to the prohibition on the use of saccharin tablets or sweetening tablets in the manufacture or preparation of any product has been made in the case of a caterer supplying food or drink in the course of his catering business.

The prices of the articles covered by the Order remain unaltered.

The Order came into force on January 30, 1944.

* * *

Use of Mineral Oil by Bakers

Bakers and other food manufacturers are reminded that the use of mineral oil as an ingredient in food is undesirable and might lead to the institution of proceedings under the Food and Drugs Act.

Objection is also likely to be taken to the use of mineral oil for greasing tins and shapes in such quantity as to cause detectable amounts to be absorbed by the product baked therein.

* * *

War Damage Act, 1943 (Part II)

The Board of Trade have, with the approval of the Treasury, decided that in respect of the six months beginning April 1, 1944, and ending September 30, 1944, the rate of premium payable under any policy issued under the Business Scheme shall continue to be at the rate of 5s. per cent.

War Risks Insurance Act, 1939 (Part II)

The Board of Trade have, with the approval of the Treasury, decided that in respect of the period beginning March 3, 1944, and ending June 2, 1944, the rate of premium payable under any policy under the Commodity Insurance Scheme shall continue to be at the rate of 5s. per cent. for three months (or 1s. 8d. per cent. per month).

Lard (Control and Maximum Prices) Order

The Ministry of Food announces that the Lard (Maximum Prices) Order, 1940, and the Lard (Licensing) Order, 1941, have been revoked and re-issued in consolidated form as the Lard (Control and Maximum Prices) Order, 1943. The new Order, which makes no change in the existing controls and maximum prices, came into force on January 16, 1944.

FUEL ECONOMY

A Joint Letter from the Ministries of Production and Fuel and Power

We invite your personal attention to two matters which are of very great importance and which are closely interrelated. The first is the question of economy in use of coal, and the second is the question of reducing the period of waggon turn-round.

On the first, we wish to emphasise that the recent decision to cut supplies of coal by 10 per cent. can only be fully effective if it is accompanied by a corresponding economy in use. The normal practice has been to build up stocks in the summer months and draw upon them in the winter months when consumption is higher and transport more difficult. This year we must expect that the strain upon our transport system will be abnormally heavy and replenishment of stocks to the usual extent will be out of the question. If, therefore, this cut in supply is not more or less balanced by economy in use its main objective will not be achieved.

The Ministry of Fuel and Power are ready to assist with technical advice on means for effecting economies. Their Regional Controllers are available to assist you both on measures for securing greater fuel efficiency and with advice as to the availability and use of substitutes, such as coke, coke breeze and anthracite duff, which are not subject to the 10 per cent. cut and are obtainable in some parts of the country. The problem is, however, essentially one for serious and constant attention by managements and workpeople throughout industry. It must therefore be the endeavour of each and every firm to see whether by greater economies or the use of substitutes or both, they cannot save the greater part, if not all, of the cut in order that essential production may not be restricted or stocks reduced to dangerously low levels.

It is recognised, nevertheless, that there will be a few cases where a reduction in consumption will not be possible if essential and urgent production is to be maintained. Machinery has accordingly been set up for the review of such cases. If, recognising that this relaxation can be granted only in cases of exceptional difficulty and importance, you consider that you are justified in appealing for a special review, you should get in touch with the Regional Office of the Supply or other Department chiefly concerned with your production.

The second point is closely related to the first though it applies to all traffic and not merely to coal. The Minister of War Transport authorises us to say that if the average turn-round of waggons could be reduced by one day we should have the equivalent of an increase of about 10 per cent. in our waggon-carrying capacity, and such an increase is vitally necessary. It is the view of the Government that in our present circumstances the maximum acceleration in loading and unloading of railway waggons should generally be regarded by all users as a first charge on their existing labour force.

From Flowers to Food

Dr. H. V. Taylor, Horticultural Commissioner, Ministry of Agriculture, in the course of a Press Conference in London recently, paid a well-deserved tribute to the British flower-growing industry for its war-time achievements in growing vegetables. Whereas before the war this country grew only 60,000 tons of tomatoes a year—a third of the tomatoes which it consumed—in 1943 British growers produced 155,000 tons, giving our people from mid-May to mid-November more than had ever reached the markets in the same period, and all home-grown.

In peace-time we ate annually 250,000 tons of onions, of which only about 6,000 tons were home-grown. Growers of tulips and daffodils round Spalding were asked to grow onions, and in 1943 we produced something like 95,000 tons—certainly the biggest crop of onions in our history.

* * *

Standardisation of Fish Boxes

It has been possible to reduce the various kinds of fish boxes hitherto in use to 12 standard types which will adequately cover the normal requirements of all fish merchants, states the Ministry of Food.

The final schedule of standard specifications has been agreed between the Ministry of Food and the Timber Control Department of the Ministry of Supply. Copies of this schedule have been sent to the Fish Industry Joint Council, representative associations of the herring trade and the National Association of Fish Cake Manufacturers, who have been asked to bring it to the notice of their members.

In future, support for applications for timber for fish boxes will normally be given only for those types of boxes listed in the schedule. The Ministry wishes to make it clear, however, that applications from fish merchants for types of boxes not included in the schedule, which may be required for a particular purpose, will be considered on their merits.

Transport of Open-Pack Meat Products

At the urgent request of the Ministry of Food, the manufacturers of open-pack meat products (sausages, pies, etc.), have recently been considering, through the Food Manufacturers' Federation, economies in the transport of their products in order to relieve the transport system and to ensure the least possible delay in the movement of these perishable foodstuffs. The chief method adopted has been the exchange of the more distant customers to eliminate long hauls and cross hauls. The interests of the customers have been safeguarded by providing that they shall continue to receive, as nearly as possible, goods of a similar type and eqivalent weight to their original supplies. The result has been to achieve an annual saving of transport on over 5,000 tons of goods, equivalent to nearly 1,000,000 ton miles.

* * *

Bacon (Control and Prices) Order, 1944

The announcement made in regard to the Bacon (Control and Prices) Order No. 164, 1944, referred to the inclusion of additional items and prices in the Third Schedule of the Order. This has caused some misunderstanding, owing to the Schedules in the new Order having been renumbered.

In the new Order the First Schedule sets out the terms and conditions of licences to produce bacon in Great Britain and Northern Ireland.

The Second Schedule sets out the fixed wholesale prices of bacon which were shown in the First Schedule of the Bacon (Prices) Order, 1941.

The Third Schedule sets out the maximum retail prices of bacon which were shown in the Second Schedule of the Bacon (Prices) Order, 1941.

* * *

The Cooking of Primary Products

A circular has been sent out by the Scottish Education Department to the seventeen education authorities in Scotland inviting them to participate in this year's competition in the cooking of Scottish primary products, oatmeal, potatoes, and for the first time, herring.

The Secretary of State, it is stated in the circular, is gratified by the success which attended the competition last year. Not only did it ensure that a large number of girls—over 20,000 competed altogether—received a specially careful training in the cooking of oat products and potatoes, but it also created an increased taste and demand in the adult community for these foodstuffs.

Freed Europe will Grow Own Food

Mr. Abraham H. Feller, General Counsel for UNRRA, has stated that the food needed to feed liberated Europe after the war would be grown by Europe itself—perhaps as much as 90 per cent.

Seeds, fertilisers, farm machinery and essential repair parts would constitute UNRRA'S primary instruments of rehabilitation.

Before the first post-war harvest, some food, clothing, fuel and other essentials would have to be provided, and UNRRA was co-operating with military and civilian authorities in the U.S. and other nations to ensure that adequate stocks were built up.

The second great task facing UNRRA would be to see that an estimated 20,000,000 persons in Europe and 40,000,000 in the Far East returned to their homes without bearing epidemics or causing economic disruption.

It is not part of UNRRA'S purpose to get refugees out of German-occupied Europe or to find places for those refugees who could not or did not want to return.

The organisation would confine its efforts in this field to seeing that those who wanted to return to their homes were enabled to do so and furnishing relief while they were being returned or were awaiting return.—*Reuter.*

Plant and Equipment

Refrigerating Machinery

The Lightfoot Refrigeration Co., Ltd., makers of automatic refrigerating machinery, announce that they are now in a position to accept orders for post-war delivery.

These orders are accepted on terms which fully safeguard clients in regard to alterations in prices. In the meantime the company offers expert advice to those interested.

* * *

Autopack (London), Limited

The Automatic Weighing and Packing Machine Co. advise that they have taken over the Colby Engineering Co., Ltd., which in future will trade under the name of Autopack (London), Ltd. This will serve as a Service Centre for London and South-Eastern counties, and will also be actively engaged in the development and production of all types of automatic plant in connection with the food, pharmaceutical, chemical, and other packing trades.

* * *

The Fire Guard's Pocket Chart

This practical chart, in its second (revised) edition, which includes notes on the Fire Guard Plan, by T. M. Ross (4d. per copy, by post 5d.; 30s. per 100; by post 30s. 7d.), (the previous issue of which was widely welcomed by fire guards of this country), contains information essential to fire guards presented by means of pictures, diagrams and tables in a manner that will facilitate training and make revision easy.

Thoroughly up to date, in addition to dealing with incendiary bombs, the chart also includes elementary first-aid, diagrams of trailer pumps, equipment and notes on the Fire Guard Plan under such headings as Duties, Manning the Sector Points, Organisation, to Summon N.F.S., Reinforcements, etc.

It is published by Jordan and Sons, Ltd.

New Glass Container

An entirely new type of glass container called the "Glascan" jar has been developed by the Hartford-Empire Company in the U.S.A., and is described in *The Canner*, 97, **25**, 30. It is a glass jar with a glass cap which uses no rubber for sealing. The new cap was a result of research which originated in the search for a rubber substitute for a removable sealing gasket which would withstand extreme pressure and cooking temperatures up to 260° F. for long periods without losing the seal. This series of investigations went hand in hand with the glass research.

No precise details are available, but it is evident that sufficient investigation has been made to suggest that the new container is one which is likely to stand the necessary tests. The Hartford-Empire offered it without charge to the canning industry as a contribution to the war effort. It is stated that what the contribution will amount to will be learned after the results of retail market test of two thousand gross are to hand.

* * *

Handling Barrels and Drums

Main precautions to prevent waste are described by Sternol, Ltd., in an instruction card suitable for display, incorporating removal and replacement; storage and handling steel drums, removal of bung; fitting a tap; prevention of leakage; copy of which will be sent on application.

* * *

The "Ogal" Colorimeter

The use of a plunger-type colorimeter for comparing the concentration of two solutions, by the application of Beer's Law, is a firmly established technique throughout the world. A solution of known qualitative composition but unknown concentration is compared with a similar solution of known concentration, and the concentration calculated as proportional to the respective heights of the two liquids in the colorimeter cups when the two colours, viewed in the eye-piece, appear equal.

Most of the well-known colorimeters are of foreign origin, and the need for a really first-class instrument of British manufacture has for long been felt. The war has intensified this demand, and the Tintometer, Ltd., in conjunction with its associated company, Optical Glass Accessories, Ltd., is now able to offer such an instrument of original design, the result of much thought and experimental work.

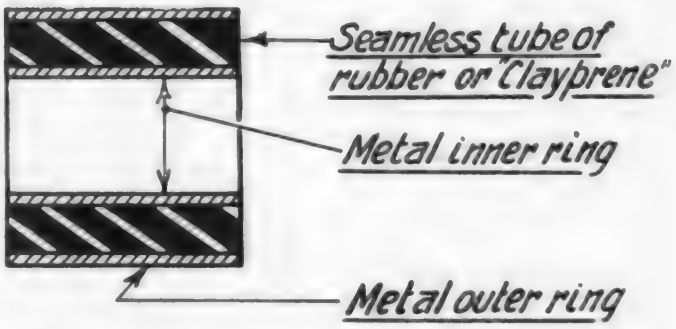
The advice and criticisms of experienced users of colorimeters is gratefully acknowledged, and as a result of the pooling of their knowledge and suggestions it is claimed that drawbacks and shortcomings of many of the instruments at present in use have been eliminated.

In particular, a very high order of accuracy can be obtained with the greatest ease.

Flexible Bearings and Bushings

With the exception of the special types of machinery whose main function is of vibratory nature such as pertains to shakers and certain types of crushers, the presence of vibration and noise is unwelcome, and any expedient that will eliminate the evil is of paramount importance to engineers.

The introduction of the "Clayflex" flexible bearings and bushings manufactured by Clayflex, Ltd., has brought a solution to many of the problems arising from the transmission of vibration and the suppression of noise in machinery; it consists essentially of a seamless tube composed of natural rubber compound, which is pre-stretched between an inner and outer metal tube, as shown in the illustration.



On account of the method adopted in pre-stretching the rubber compound between the inner and outer metal tubes, the rubber continually seeks to conform to its original shape, with the result that the constant force exerted within the rubber ensures a high capacity bond between the rubber and metal; the strength of this bond is such that it will only break down after the imposition of a considerably higher overload than that for which the bearing has been designed.

Among the many applications to which these bearings and bushings have been successfully employed are the shock damping medium in concrete tampers on the track rollers of tractors, prolonging of the life of ball, roller and needle bearings, the flexible bearings in link-motions, armature and trunnion bearings on electric motors, in addition to acting as flexible thrust mountings and bushings for press gears and for fitting to shafts that are liable to parallel and angular misalignment.

* * *

New Du Pont Plastic

A very important new plastic material called polythene is now being manufactured in commercial quantities by Du Pont de Nemours and Co. It is particularly notable for its electrical properties and its high insulating ability is said to exceed that of any other present plastic material.

It is made by polymerizing ethylene by means of a secret catalyst; since ethylene is a comparatively cheap starting point chemists believe that the plastic will eventually be low in cost.

It is now available only for war purposes, but it is adaptable also to the making of collapsible tubes for tooth paste, waterproof coating, piping, adhesives and insulation for wires and cables; it is outstanding for its flexibility and toughness over a wide range of temperatures and its resistance to water and chemical inertness. Because of its qualities it occupies a peculiar place among plastics, in between limp rubbery materials and the hard rigid type—it can be fabricated by all present methods.

* * *

Plastic Ice Boxes

The use of plastic ice boxes, or steel lined or glass lined plastic cases, is being considered by the ice industry in Scotland. The ice trade has suffered very seriously through the widespread adoption by retailers in the food and allied trades of cabinet refrigerators. Trade rapidly decreased pre-war, some ice-making firms placing the decrease in business at as much as 20 per cent. of previous turnover. The continuation of this trend post-war is worrying the more progressive firms who are looking for some alternative outlet for ice. The domestic market offers vast potentialities provided it is worked adequately and intelligently. A brief scheme has been outlined by some of the firms, and although unanimity has not been achieved as yet, the matter is still pending. It is hoped that cheap plastic containers or glass or steel containers could be mass-produced and presented free of charge to householders to encourage the storage of ice in every home.

* * *

Course in Industrial Instrumentation

About six months ago a short and very intensive course in the theory, operation and maintenance of industrial instruments was devised by Bristol's Instrument Company, Ltd. Selected personnel were invited to attend this course. The results were so encouraging that the scope of the course was extended, and there was opened an Instrumentation Class, which was attended by 26 people representing 14 different firms, many of them leaders in their particular industry.

The course consisted of a series of lectures coupled with practical work and demonstration. A particular feature was a "Brains Trust" towards the end of the course during which questions on instrumentation were brought up, discussed and answered by the members of the class. Some of the information which was discussed was very revealing, and a good deal of benefit was gained by all in discussing methods of overcoming common problems.

With the tremendous advances made in recent years in automatic control and the paucity of published information on the underlying principles of automatic control, considerable confusion exists in the minds of users on the correct type of control to use on any given application. If this country

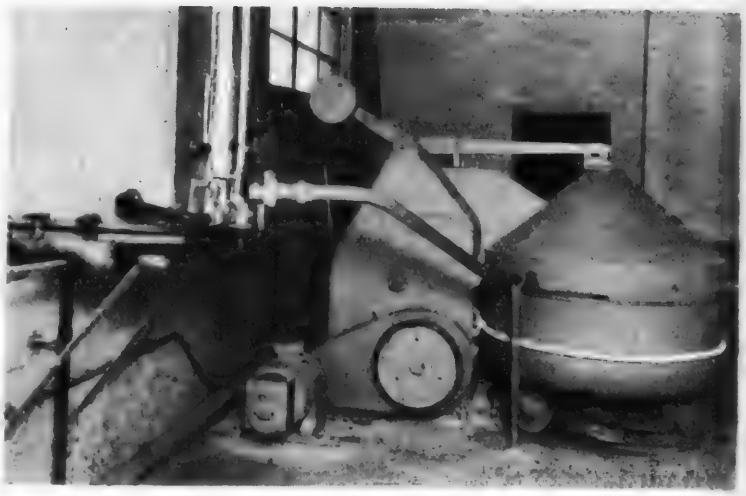
is to progress and maintain a leading position in industry after the war it is essential that personnel responsible for the design, erection and maintenance of industrial processing equipment have a thorough grasp of the main principles of automatic control, and it is extremely gratifying to see that so many firms are sufficiently farseeing to realise the importance of instrumentation and to spare even executive personnel to spend time in acquiring a greater knowledge of the application and possibilities of automatic control.

* * *

Coal Gas in the Food Industry

The use of town's gas in modern food industries is very extensive. In addition to such trades as baking, biscuit-making, jam-making, bacon curing, and food preserving, large quantities are used for such diversified purposes as the manufacture of baby foods and patent foods, fish-frying, flour-milling, grain-drying and cold storage. Cereal drying is now being undertaken very sucessfully by gas, particularly sago flour, which is recognised as one of the most difficult products to dry—a rotary louvre-type dryer with modifications has proved most effective.

For the best up-to-date methods of coffee roasting, gas is used almost exclusively. A roaster of the latest type, recently installed at Cardiff, has a drum with gas burning externally circulating the hot products of combustion, which do not exceed a temperature of 900° F., this being the most suitable roasting temperature. Coffee fumes, and any chaff which does not drop into the tray provided, are drawn off from the top of the roaster by an exhausting fan; this also draws the air necessary for cooling the roasted coffee discharged into the cooling tray. In order that the cooling of the coffee shall be as rapid as possible, and to prevent its catching fire after discharging, the cooling tray is provided with four paddles, which continually agitate the coffee. The drum has a normal working load of 56 lbs. per roast.



WATER TEMPERATURE CONTROL IN THE BAKERY

The application of thermostatic hot and cold water mixing valves and steam and water mixers to the process of dough-making in bakeries is one which merits the serious attention of every bakery engineer.

As is well known, dough-mixing machines require to be supplied with hot water at a suitable temperature, adequate control of this temperature and uniformity of temperature throughout the water contained in the tempering tank provided for the purpose being essential if good batches of consistent quality are to be produced.

The method commonly in use is a simple arrangement whereby supplies of hot and cold water are taken to the tempering tank, being individually controlled by means of stopcocks, the respective quantities of hot and cold water admitted being regulated by manipulation of the stopcocks in an endeavour to produce the desired temperature of blended water as indicated by the thermometer fitted to the tempering tank.

This admittedly hit-and-miss method of controlling the blend is necessarily wasteful of water and of the operator's time, and, moreover, has the effect of causing the contents of the tank to consist of "pockets" of water of varying temperatures.

On the question of waste, experience has shown that as much as 40 gallons per day are wasted in one tank alone in a typical bakery in the course of obtaining the requisite blend of water for dough-mixing, with corresponding wastage of fuel.

The advantages offered by the installation of Leonard Thermostatic Mixing Valves, manufactured by Walker, Crosweller and Co., Ltd., in connection with this process are derived from the fact that these valves when connected to supplies of cold water and either hot water or steam, will deliver water to the tempering tank at a pre-determined temperature, and will maintain this temperature irrespective of reasonably wide fluctuations in the temperature and pressure of the supplies. By this means waste of water, fuel and time is eliminated and uniformity of temperature throughout the tempering tank is ensured.

A typical installation in a well-known London bakery is illustrated here. In this case a steam and water mixer is installed, arranged so that cold water can be supplied to the mixer either from mains or static tank. The engineer reports that the steam boiler is fired only an hour before dough-mixing commences, steam at only 5 lbs. pressure being sufficient to produce water at 120° F. While the steam pressure is then increasing, the dough-mixing is carried out and ample time is given for the pressure to increase before steam is required for final prover and oven. This procedure effects a considerable saving of fuel in practice. A thermometer is fitted to the outlet from the mixer.

Agriculture

Control of Corn Diseases

An exhibit showing how certain corn diseases can be controlled by dry dressing the seed with an organo-mercurial dust is housed in the demonstration van of the Hereford War Agricultural Committee. This van is now touring all the country markets. Recently in Hereford cattle market over 300 farmers showed much interest in the story it had to tell. Samples of unmillable wheat due to "bunt" were on show, and it was pointed out that, had the grower treated the seed before sowing, the wheat would have gone to make bread for the nation. Pot samples of growing oats illustrated the complete control of leafstripe by seed treatment.

* * *

100,000 lb. Dairy Shorthorn

Streetly Lady Barrington 3rd, owned by Mr. J. D. Webb, of Streetly Old Hall, West Wickham, has exceeded a yield of over 100,000 lbs. of milk. She gave over 84,000 lbs. in her seven completed lactations, and in her eighth, which has now run for 251 days, she has produced 16,202½ lbs. Her daily yield is still 50 lbs. Streetly Lady Barrington 3rd is the tenth daughter of the cow Hastee Barrington 6th, which produced just over 120,000 lbs. of milk in eleven lactations.

* * *

Agricultural Brains Trust

At a recent Agricultural Brains Trust held in the Wisbech Corn Market, well over 800 people came in from surrounding parts to attend. The questions asked and answered dealt with sugar beet, proven bulls, artificial manures, purchasing a farm, eelworm dangers, row-widths for peas, drainage, artificial insemination, and a dozen other subjects of present importance. Mr. Donald McCullough, acting as Question-Master, led a team comprising four well-known farmers in the area, the Horticultural Superintendent of the County, and the Technical Advisory Officer to the Isle of Ely War Agricultural Executive Committee.

OBITER DICTA

● Pigeons eat our crops so what better than that we should eat them?—*Colonel Llewellin.*

● De-rationing will be a gradual process.—*Colonel Llewellin in an interview with the "Daily Herald."*

● The conversion from war to peacetime production is not going to be a picnic.—*"National Farmers' Union News Sheet."*

● Many people are suspicious of canned foods; but there's really no need to be.—*G. Morley Davies, in "Bristol Evening World."*

● I have not enough tea to make an issue to every women's meeting throughout the country.—*Colonel Llewellin, in the House of Commons.*

● We do not know how long this war may last, but every day it does last the situation regarding food and things to be got from outside is going to be worse and worse as far as we are concerned.—*Mr. De Valera.*

● Only the Ministry of Food can really say when we will or will not receive supplies of fish. Their attitude to the problem is that "fish is fish" and the public must eat—and like—whatever is set before it.—*Mr. Dove, Secretary of Billingsgate Market.*

● The home fruit industry has, I believe, a great future. It has, despite the difficulties of wartime, made great strides in efficiency. One of the main things left now is to devise a sound marketing system for their products.—*Mr. R. S. Hudson.*

● If the average housewife puts waste food in the dustbin she contravenes the salvage of waste materials order, and if she feeds it to her poultry and rabbits she breaks the law. So she often burns or buries it.—*Mr. J. McA. Reid, Chatham's Food Officer.*

● Where do our critics think that the peacetime Government of a democracy keeps the army of experts that becomes necessary on the outbreak of war? The answer, of course, is that they do not keep such a force. The only reservoir upon which the State can draw in the hour of emergency is provided by the great enterprises of the country.—*Lord M'Gowan.*

Rose Hip Crop

The biggest rose hip crop ever harvested was collected in 1943, exceeding the previous year's by 167 tons. Last year's 500 tons was equivalent in vitamin C content to 25,000,000 oranges, and is estimated to produce 2,500,000 bottles of national rose hip syrup for children. The syrup is made to a definite vitamin standard, and is on sale at chemists' shops.

* * *

Britain Leads in Mechanised Farming

Lord de la Warr, chairman of the United Kingdom Agricultural Research Council, told the Canadian Club: "Since the start of the war British agriculture has become the most mechanised in the world."

British farmers, he said, were producing three times as much per man as German farmers, and British wheat production per acre was nearly three times as much as that of the United States.

He declared that organised and greater food production must be the keynote of future policy.—*Reuter.*

* * *

Obituary

Mr. Arthur Heatley

We regret to announce the death on February 29 of Mr. Arthur Heatley, who has represented Stevenson and Howell, Ltd., in the Lancashire and North Wales areas since 1919.

Mr. Heatley's engaging personality and business acumen endeared him to a very wide circle of friends.

* * *

Mr. Charles Duncan

Mr. Charles Duncan, who died recently in Edinburgh, was one of four brothers who built up the well-known chocolate manufacturing firm of Messrs. W. and M. Duncan, Ltd., Beaverhall, Edinburgh. He had been connected with the firm for the past forty-five years, starting originally as manager of the firm's shop in the High Street and later becoming secretary of the company. He was later still in control of all the shops owned by the firm. He was 72 years of age.

Overseas Items

Australian Meat Drive

Manpower officers in all Australian states will shortly start a big drive to secure large numbers of drovers. They will help bring in thousands of cattle from North-West and Central Australia to the Southern killing areas.

The scheme is part of a plan to increase meat production to record proportions. Figures issued by the Commonwealth statistician show that male employees in rural industry numbered 120,000 last March compared with 200,000 before the war.

Farm owners, occupiers, and unpaid relatives working on the farms have decreased by 60,000. There was an increase of 40,000 in the number of women rural workers.—*Reuter.*

* * *

U.S. Buys Canadian Wheat

U.S. proposes to buy 175,000,000 bushels of Canadian wheat in 1944, if transportation facilities are available, says Reuter.

Tentative terms for the purchase, the Canadian Minister of Trade and Commerce, Mr. Mackinnon, stated, are being made by the U.S. War Food Administration.

U.S. buyers intend to move 40,000,000 bushels of the proposed 175,000,000 bushels purchased direct in U.S. railway cars from Western Country points, 30,000,000 bushels by ship from Vancouver and other Pacific ports and 105,000,000 bushels by Lake-ships during the 1944 season of navigation.

* * *

Drought in Portugal

This winter's drought was one of the worst ever to be experienced in Portugal.

Crops have suffered greatly, and anxiety is felt about a famine next winter. Even so, the damage caused to crops is already very considerable, and Portugal will have to face serious difficulties in her food supply.—*Reuter.*

CAIRO AGRICULTURE TALKS POINTER TO WORLD PROSPERITY

Lord Moyne, Minister Resident in the Middle East, stated in a message to the Agricultural Development Conference recently concluded in Cairo: "I believe the conference is a significant step towards practical co-operation between the Middle East and Britain.

"Agricultural leaders in the Middle East are doing pioneer work which may prove an example to other regions of the world. It is a pleasure to know that Britain has played a part in this work through the Middle East Supply Council."

The Conference passed a fourteen-point resolution, and among subjects emphasised was the necessity for Middle East countries to develop their agricultural resources, and for irrigation and other war-time schemes to be carried on after the war and not allowed to lapse.

Governments of the ten territories represented at the Conference will now consider the setting up of a Council of Agriculture to review technical problems associated with agricultural development. The countries represented are Aden, Cyprus, Egypt, Iraq, the Lebanon, Palestine, Saudi-Arabia, Sudan, Syria and Transjordan.—*Reuter.*

New Food Yeast Industry

The manufacture of food yeast from molasses has been carried a stage further by the erection of an experimental plant in Natal, Reuter reports.

The industry is to be developed on a national scale, with the sugar industry co-operating.

When it gets into its stride it is hoped that it will be able to produce new and revolutionary food at the rate of about six tons every twelve hours for every ton of "seed" planted.

* * *

Trading in Spices and Copra

The Government of India has prohibited "futures" trading in copra and the following spices: betelnuts, cardamoms, chillies, cinnamon, cloves, ginger, pepper, turmeric, and nutmegs.

The prohibition came into force after the close of business on February 2.

During the interval between the issue of the notifications and the affected date, it is open to operators voluntarily to liquidate their contracts. All contracts outstanding at the close of business on February 2 were closed at a rate to be fixed by the Government of India.

Certain specified forward contracts are exempted from the above prohibition.

World Food Council After War

Plans for a permanent Food Council for post-war internal co-operation were suggested recently by Mr. Paul H. Appleby, Under-Secretary of the U.S. Department of Agriculture, speaking at the annual meeting of the Canadian Federation of Agriculture. They included special measures to see that children, mothers and the very poor are better nourished; improvement and extension of marketing, transportation, modern storage and processing; increased production of certain types of food; concentration of crop production in parts of the world best suited to raise them; protection against inflation and deflation; research and education; and, finally, orderly and friendly internal trade.

"The proposal contemplates a Governing Council comprising representatives of all the member nations of the Hotsprings Conference."—*Reuter.*

* * *

Canadian Cheese for Britain

Mr. James G. Gardiner, Canadian Minister of Agriculture, has announced in the House of Commons that a contract is being negotiated under which Britain will take all the cheese Canada can provide during the next two years.

Planned Economy for French Colonies

The French African Conference has so far unanimously declared itself in favour of planned economy with all its consequences in the French Colonies after the war.

The delegates have agreed to plan a great decentralisation in the administrative and political domains, and, on the other hand, to establish real economic and technical centralisation throughout the empire.

The Conference also adopted a proposal to distribute modern equipment to farmers. The industrialisation of the colonies will not be pushed, but at the same time processing industries will be created at suitable points.—*Reuter.*

* * *

New Zealand to have Central Milk Authority

The creation of a central authority to guide, control and conduct the development of New Zealand's liquid milk industry is the chief recommendation of the Commission which last year inquired into supplies.

Mr. B. Roberts, Minister of Agriculture, has promised early legislation for the purpose.

The powers of the authority, says the Commission's report, should be to advise the Government, to interpret and administer national milk policy, and determine prices for producers and consumers.

The establishment of milk councils at the chief centres for the purpose of applying the central authority's policy is also recommended.—*Reuter.*

* * *

Australia Wants Food Ministry

A demand for the setting up of a separate Food Ministry in Australia has been made in the Federal Parliament by Sir Earle Page.

Moving the adjournment of the House to discuss the food position as a matter of urgency, he said that the collapse of food production was inevitable unless a single Ministry was appointed to wipe out irritating contradictory regulations and conditions which were being imposed by the different departments.

A report from Canberra says that, according to preliminary estimates compiled there, the production of milk will fall short of the 1943/4 target by 50,000,000 gallons. Other shortages would be: Butter, 15,000 tons; eggs, 10,000,000.

The fall in the output of butter is partly accounted for by the diversion of milk to dry and condensed milk production, which has increased five-fold since 1938-39.—*Reuter.*

* * *

U.S. Soldiers can Study British Farming

American soldiers on leave in England may study British farming methods on farms in South-Western England, it was announced by the U.S. War Department recently.

The plan is under the direction of the educational branch of the special service section, with the co-operation of the British Council and the Devon War Agricultural Executive Committee.

University graduates in agriculture or men with equivalent training are eligible to enrol.—*Reuter.*

* * *

Ukraine and German Food Supplies

The Basle *National Zeitung*, in a recent leading article entitled "The Ukraine and German Food Supplies" stated: "On October 5, 1942, Goering said: 'In the Ukraine there are eggs, butter, flour and oil in unimaginable quantities. I hope food rations can be further increased next year.'

"Nothing remains of this prophecy but words, for the rapid deterioration of German food supplies is closely connected with military developments.

"To-day the German food position is considerably worse than in 1941, whereas in 1942 Goering stated that the 1941 level would be insufficient to carry on.

"Yet Germany was then still able to procure something on the side which is absolutely impossible to-day.

"Moreover, the loss of the Ukraine deprives the *Wehrmacht* of an independent supply base at a time when over 14,000,000 foreign workers must be fed, and the domestic harvest is alarmingly deficient.

"These facts give an ominous picture of Germany's food position in spite of attempts to compensate for deficiencies by increased issues of pork and lard.

"The results of this inadequate nutrition are a soaring increase of deficiency diseases, which cannot always be medically diagnosed when the body is simultaneously excessively exerted by overwork."

* * *

U.S. Allocation of Milk Powders

Of the 56,700,000 lbs. of whole-milk powder allocated from America's 1944 supplies for export, British overseas services will receive 11,400,000 lbs.

Russia is to get 15,800,000 lbs., the Red Cross 15,200,000, friendly nations other than U.S. military Allies 11,800,000, and U.S. territories 1,000,000.

Nearly 110,000,000 lbs. of the 160,000,000 lbs. of dried skim milk allocated to Allies and others will go to the U.K., including British services overseas.

Production of both products is expected to be larger in 1944 than in 1943.—*Reuter.*

* * *

U.S. Doubled Food Lend-Lease in 1943

U.S. deliveries of food and other agricultural products for export under Lend-Lease in 1943 totalled 11,488,000,000 lbs., more than double the 1942 deliveries of 5,300,000,000 lbs., the U.S. War Food Administration reported recently.

Of the 900,000,000 lbs. delivered in December, 1943, 51 per cent. were for Russia and 42 per cent. for the British Empire.

Major products in the December total included, by weight, sugar 19 per cent., meats 22 per cent. and dairy products 12 per cent.

The 900,000,000 lbs. laid down at shipside during December were somewhat smaller than the quantities delivered in the previous two months—1,015,000,000 lbs. in November and 1,115,000,000 lbs. in October.—*Reuter.*

Canadian Butter Cut

The Canadian butter ration for March was cut by eight ounces, the equivalent of one week's personal supply.

It is expected to save 5,000,000 pounds of butter in this way.—*Reuter.*

* * *

Argentina Maize Acreage Raised

The first official estimate of the area sown to maize this year gives a total of 4,570,000 hectares (about 11,300,000 acres), an increase of 431,000 hectares (1,065,000 acres) over 1943.

* * *

Brazil Expanding Rubber Output

Dr. Valentine Boucas, special representative of the Brazilian Government, said recently that now his country had taken over from the U.S. all rubber operations in Brazil, it was intended to expand rubber production. It was hoped eventually to produce about 100,000 tons a year for export to the U.S.—*Reuter.*

* * *

Chemists' Wartime Convention

Wartime developments in chemical science and industry will be reported at the hundred and seventh meeting of the American Chemical Society from April 3 to 7. Several thousand chemists and industrialists will participate. Hundreds of papers outlining advances in many fields of research will be presented.

Fourteen of the society's eighteen professional divisions will convene. Post-war planning will feature sessions of the division of industrial and engineering chemistry under the chairmanship of Dr. Lawrence W. Bass of Bolton. "Antiparasitic Agents as Used in Tropical Diseases Other than Malaria" will be the general theme of the division of medicinal chemistry, headed by Dr. John H. Speer of G. D. Searle and Company, Niles Centre, Illinois. "The Biological Value of Proteins" and "Carbohydrates for Industrial Use" will be discussed at a joint meeting of the division of agricultural and food chemistry and the division of sugar chemistry. Papers on vitamins will be read at a session of the agricultural and food and biological divisions.

"Industrial Demands for Non-Laboratory Chemists" will be the topic of the division of chemical education, of which Dr. Laurence L. Quill of Ohio State University is chairman. Papers on "Detergents and their Actions on Biological Systems" and "Theory of Long-Range Elasticity" will be submitted to the division of physical and inorganic chemistry, of which Dr. Oscar K. Rice of the University of North Carolina is chairman.

General sessions will be held by the divisions of analytical and micro-chemistry, cellulose chemistry, colloid chemistry, gas and fuel chemistry, organic chemistry, sugar chemistry and technology, and water sewage and sanitation chemistry.

An employment clearing house will be maintained in the Cleveland Public Auditorium April 2 to 7 to provide facilities for bringing together employers seeking chemists and chemical engineers and members and students affiliates of the Society, which is the largest professional organisation of its kind in the world with a membership approaching 40,000.

A special programme for women chemists is being arranged.

* * *

Agar-Agar Manufacture in Eire

In connexion with work on seaweeds, the Emergency Research Bureau of Eire have been concerned with finding a substitute for agar-agar. This has met with success, and a commercial firm is stated to be able to make a high quality agar-agar.

Midland Bank, Limited

The directors of the Midland Bank, Ltd., announce that they have elected Mr. Clarence T. A. Sadd, C.B.E., J.P., D.L., to be vice-chairman of the Board. Mr. Sadd will continue as chief of executive of the bank.

Mr. Sadd has also been appointed vice-chairman of the Midland Bank Executor and Trustee Company, Ltd.

Societies

Food Education Society

A lecture, "Food and the Teeth", by Sir Norman Bennett, M.A., M.B., L.D.S., will be given at the Conference Hall, School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, London, W.C. 1, on Monday, April 24, at 3 p.m.

* * *

Association of Scientific Workers

Professor P. M. S. Blackett, M.A., F.R.S., has been appointed President of the Association of Scientific Workers as from February 1, 1944. Professor Blackett is Langworthy Professor of Physics at the University of Manchester, and during the war is working for the Admiralty. Prior to his Manchester appointment he was Professor of Physics at Birkbeck College, University of London. He is widely known for his work on nuclear physics and cosmic rays. He was educated at R.N. Colleges Osborne and Dartmouth, and served with the Royal Navy during the last war. He has broadcast and written articles on the development of science and its relation to society. He has been an active member of the A.Sc.W. since 1927, and has helped to build up the Association, which at present has a membership of just under 15,000 scientific workers.

* * *

Nutrition Society

Meeting to be held in London, May, 1944.

Budgetary and Dietary Surveys of Families and Individuals. Part II.

(1) Food Consumption: Data Obtained from Analyses of Institutional Diets.
  (*a*) Analyses of Service Budgets and Diets.
  (*b*) School Diets.
  (*c*) Industrial Canteens.
  (*d*) Hospitals.
(2) Surveys of Methods Used in Preparing and Cooking Food.
(3) Laboratory Assessment of Nutritive Value of Meals.

The participants will include Dr. M. Pyke (Ministry of Food), Dr. Gertrude Wagner (Wartime Social Survey), and other speakers.

Information and Advice

Flavours of Carrot in Essential Oils

9,122. *We were interested in the article on Flavour and Food, by R. W. Moncrieff. He mentions that flavours of carrot are found in essential oils. We should very much like to know more about the nature of the essential oils responsible for the flavour of the carrot.* (Cambs.)

There is a description of various carrot oils by G. Igolen in *Parfums de France*, 1936, **14**, 177-81.

Baking Powder

9,080. *We are thinking of manufacturing a baking powder and would appreciate your assistance in advising us of a suitable formula. We understand that tartaric acid and bicarbonate of soda are essential ingredients of baking powder, and we should be glad of any further advice on this matter.* (Lancs.)

Tartaric acid is not an essential ingredient of baking powder. There are a great number of baking powders which do not contain it. We suggest you read the articles on the subject which appeared in FOOD MANUFACTURE as follows:

"Phosphates in Baking Powders," by R. G. Stilton, October, 1942, p. 287.
"The Adjustment of Reaction of Terminal Residues of Baking Powders," by Simon Mendelsohn, F.A.I.C., April, 1940, p. 94.

These should give you the requisite information to enable you to experiment.

Production of Whole Sugar

8,926. *Required, information concerning a process to produce a "whole sugar" by the dehydration of cane juice clarified by mechanical means alone and free from the chemical clarifications ordinarily used for the purpose.* (New York.)

The following note from *International Sugar Journal*, Vol. 46, January, 1944, p. 28, may be useful:

"Mario A. Mascaró recently described a method of working for the production of so-called 'integral sugar', consisting of the following steps in the treatment of the cane juice: Filtration, treatment with a sterilising chemical (as formaldehyde), freezing, crushing of the congealed mass; repeated separation of the juice from the ice; and finally dehydration by atomisation. In this way a cream-coloured sugar product can be obtained having a distinctive taste and odour and said to contain vitamins A, B complex, C and K."

A similar method was recently described (*International Sugar Journal*, 1943, p. 336). It is curious that at the time of the last war several similar whole-juice processes for which extravagant claims were made came to the front. One put forward started from beet juice, and a sugar was obtained which, as one would expect, was anything but palatable, whatever its nutritive qualities may have been.

Fish Pastes

8,837. *We are experimenting re the production of fish pastes and would be glad to have any information re the recipes, method of manufacture, etc., of these lines.* (Scotland.)

Articles on fish pastes appeared in FOOD MANUFACTURE, July, 1940, pp. 172-175, and July, 1938, pp. 220-224. These may help you in your experiments.

Information Supplied

9,034. *Address of Scottish soya bean factory.* (London.)

9,049. *Suppliers of carrot juice and carrot powder.* (Middlesex.)

9,055. *Address of the Food Education Society.* (Northants.)

9,061. *Information on some form of adhesive for fastening carborundum grit to metal for use in potato cleaning machines which are also fed with jets of water.* (Norfolk.)

9,066. *Information re memorandum on the recommendations of the World Food Conference at Hot Springs.* (Staffs.)

9,072. *Literature on the manufacture of margarine.* (Australia.)

9,073. *Suppliers of herring-boning machine.* (British Columbia.)

9,074. *Suppliers of pimento, chilis, etc., in any form.* (Sussex.)

9,076. *Information regarding a "test case" on ice cream.* (London.)

9,077. *Possible sources of supply of cocktail cherries.* (Sussex.)

9,081. *Sources of supply of pure glutamic acid or its salts.* (London.)

9,087. *Suppliers of ingredients for packet soups, custard powder, gravy thickener and flavouring, pea flour. Information concerning licences and possibility of obtaining the materials in bulk for packing.* (Notts.)

9,092. *Reference to potato plastics.* (London.)

9,104. *Information re Sale of Food Regulation 1943 No. 1553.* (Glos.)

9,111. *Suppliers of crushed mustard seed in bulk.* (Yorks.)

9,112. *Occasional publications on scientific horticulture.* (Lancs.)

Information Required

Name and address of British Agents for Atlas Co., Ltd., of Copenhagen, manufacturers of Atlas Ammonia Compressors.

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

An Improved Method of Preserving Fruit

This invention relates to preserving fruit, particularly apples, by the application to the exterior thereof of emulsions of oils or paraffin wax, or both, in order to hinder or retard the undesirable changes which normally occur during storage thereof. It is based upon the observation that the presence in paraffin oil or paraffin wax emulsions of proportions of higher olefines such as caprylene operates to increase the efficacy of the treatment in the direction of hindering or preventing certain changes which are liable to occur in the fruit.

Optionally, the emulsion may contain also a proportion of a substantially tasteless fatty oil.

For the purpose of the invention any emulsifying agents which are substantially tasteless may be used.

Thus, sodium or potassium salts of fatty acids other than linoleic acid may be employed as emulsifying agents.

Further, in accordance with the invention, fatty acid esters of an ethanolamine—for instance, triethanolamine—or morpholine may be used.

The sulphates of higher fatty alcohols such as are generally known as sulphonated fatty alcohols may also be employed.

In many cases the emulsifiers employed act not only as emulsifying agents but as wetting agents.

551,714. John Carter Fidler and Alfred Cresswell Hulme.

Improved Process for the Preservation of Eggs

Various substances known to have anti-oxidant effects on various organic materials are ineffective with dried egg, but the inventor found that the addition of cysteine is effective in preventing or reducing the development of off-flavours caused by oxidation when dried egg is stored under conditions permitting the access of oxygen—*e.g.*, in air.

The cysteine may be introduced into the egg at any convenient stage before drying, but it is preferable to add it to the egg pulp, and a suitable proportion is from 0·005 to 0·02 per cent. by weight of the undried egg.

The inventor states that he is aware of the Public Health (Preservatives, etc., in Food) Regulations, 1925-27, and makes no claim to the use of the invention in contravention of the law.

551,827. Jack Brooks.

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

554,173. SCHAUL, M. C., and DEUTSCH, B.: Process for the production of edible products from whey.
554,313. CLAY, C.: Process of crystallisation employed in the manufacture of confectionery.
554,389. ELECTROLUX, LTD.: Manufacture of refrigerating apparatus.
554,438. FERREE, J. C.: Treatment of soya beans.
554,488. WILES, R. M., WILES, J. K., WILES, J. C., and WILES, I. W.: Boilers for steam cookers or the like.
554,609. HUMPHREY, G. F.: Preparation of foods.
554,776. SPOONER, W. W.: Manufacture of foodstuffs.
554,823. CORN PRODUCTS REFINING CO.: Production of dextrose or dextrose-containing products.
554,826. Production of dextrose. Addition to 554,823.
555,190. MACKAY, D. P.: Container or pot for the use of prepared mustard, tooth paste or any such thick liquids or semi-liquids.
555,273. KATZ, L.: Self-heating food-preserving containers.
555,452. CARTNER, J., MOORE, H. G., and SUTCLIFFE, T.: Machines for capping bottles, cans, or like containers.
555,534. VICARS, LTD., T. and T., and CROSLAND, E. M.: Baking ovens.
555,616. FORD WELDING AND ENGINEERING CO., LTD., and FORD, F. T.: Bins and stands or racks for storage and like purposes.
555,636. LANT, R.: Treatment of vegetable seeds and particularly to the treatment of soya beans.
555,660. KENNEDY, D. S., and NEWMAN, J. E.: Apparatus for drying grain and other discrete materials.
555,738. POINTON, J. E., HARBER, L. S., and BAKER PERKINS, LTD.: Dough mixing and kneading machines.
555,794. MCDONALD, H. M.: Apparatus for filling containers with milk and other liquids.

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

NOURITA. — 619,920. Chocolate, cocoa, coffee, tea, biscuits (other than biscuits for animals), confectionery and sweetmeats (none being medicated), flavourings (other than essential oils). **Barker and Dobson, Ltd.,** Franklin Place, Whitefields Road, Everton, Liverpool 6; Manufacturers.

SEM-SET.—B622,575. Wheaten products for use in making blanc-mange and custards, and for use in thickening gravies, soups and sauces. **Sunmill Food Products, Ltd.,** 4, Vestry Street, London N. 1; Merchants.

CHO-KOL.—622,692. Coffee, cocoa, flour, cereals prepared for use as food for human consumption, biscuits (other than biscuits for animals), cake mixtures, blanc-mange powders, custard powders, confectionery (not medicated), honey, treacle, yeast, baking powder, sauces and spices. **Anglo Dairies and Canners, Ltd.,** 101, Beddington Lane, Croydon, Surrey; Manufacturers and Merchants. To be Associated with No. 605,194 (3188) xxix and another.

New Companies

J. Hurley and Sons (Bakers), Limited. (380642.) 35b, Union Street, Tipton, Staffs. To take over a bus. cd. on as "John Hurley and Sons" at Tipton. Nom. cap.: £3,000 in £1 shares. Dirs.: J. Hurley, 35b, Union Street, Tipton, Staffs; L. Hurley, Trentham House, Foxyards, Birmingham New Road, Tipton; N. Hurley, Tipton; and H. Hurley, Dudley.

Sharp and Cook (Refrigeration), Limited. (380604.) 126, Ulverley Green Road, Olton, Birmingham. Nom. cap.: £2,000 in 1,250 pref. and 750 ord. shares of £1 each. Dirs.: W. C. Edwards, Walnut Tree House, Clent, nr. Stourbridge; W. S. Sharp, 126, Ulverley Green Road, Olton, Birmingham, 27; J. R. Cook, 429, Hagley Road West, Birmingham, 32.

Wiltshire Casing Manufacturing Company, Limited. (384020.) 1, Dover Street, London, W. 1. To carry on bus. of mnfrs. of sausage casings, etc. Nom. cap.: £100 in £1 shares. Dirs.: C. C. Barry and Cicely Barry, both of Beechwood, Tabley Road, Knutsford, Ches.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.